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NORTH CAROLINA Wildlife RESOURCES COMMISSION

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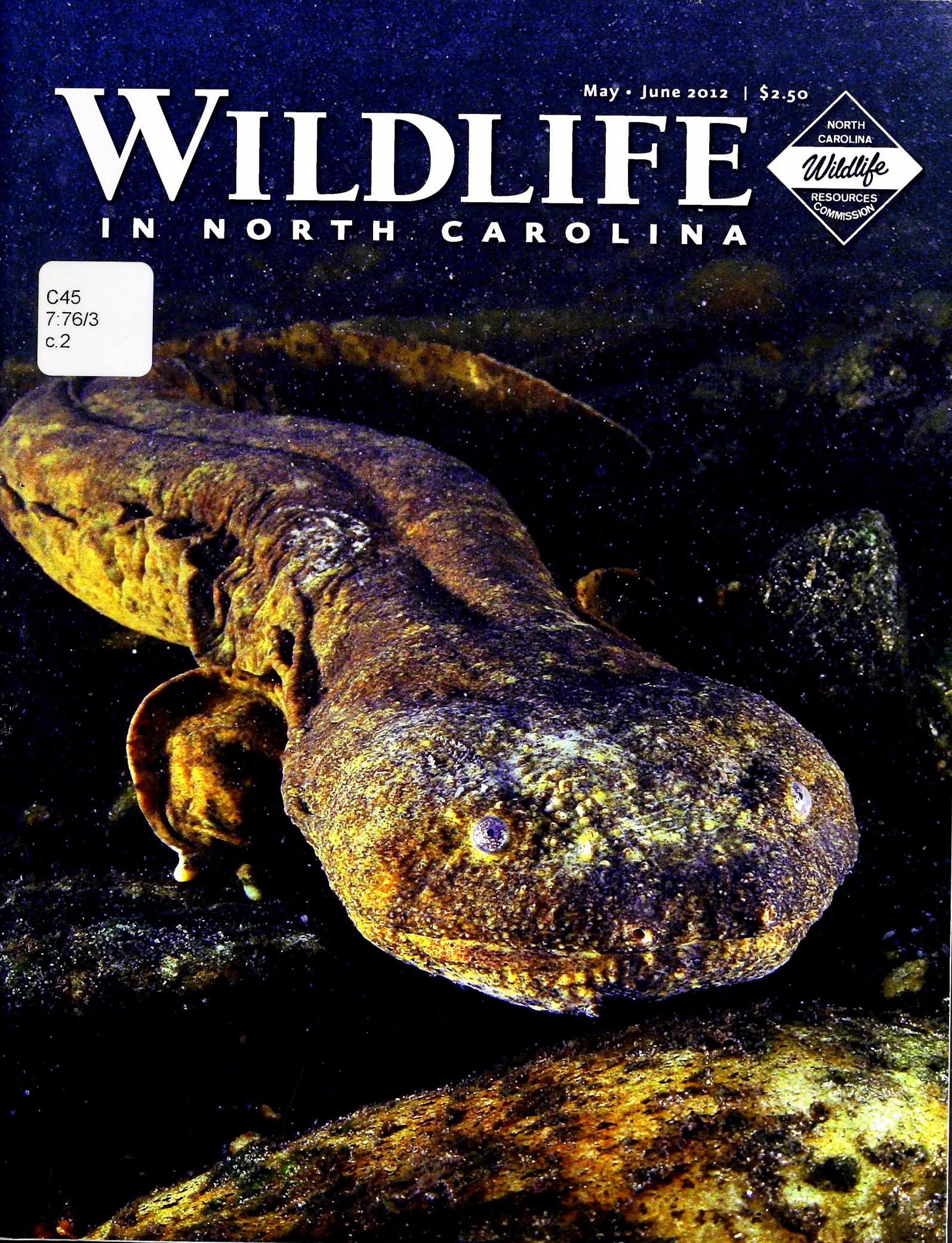
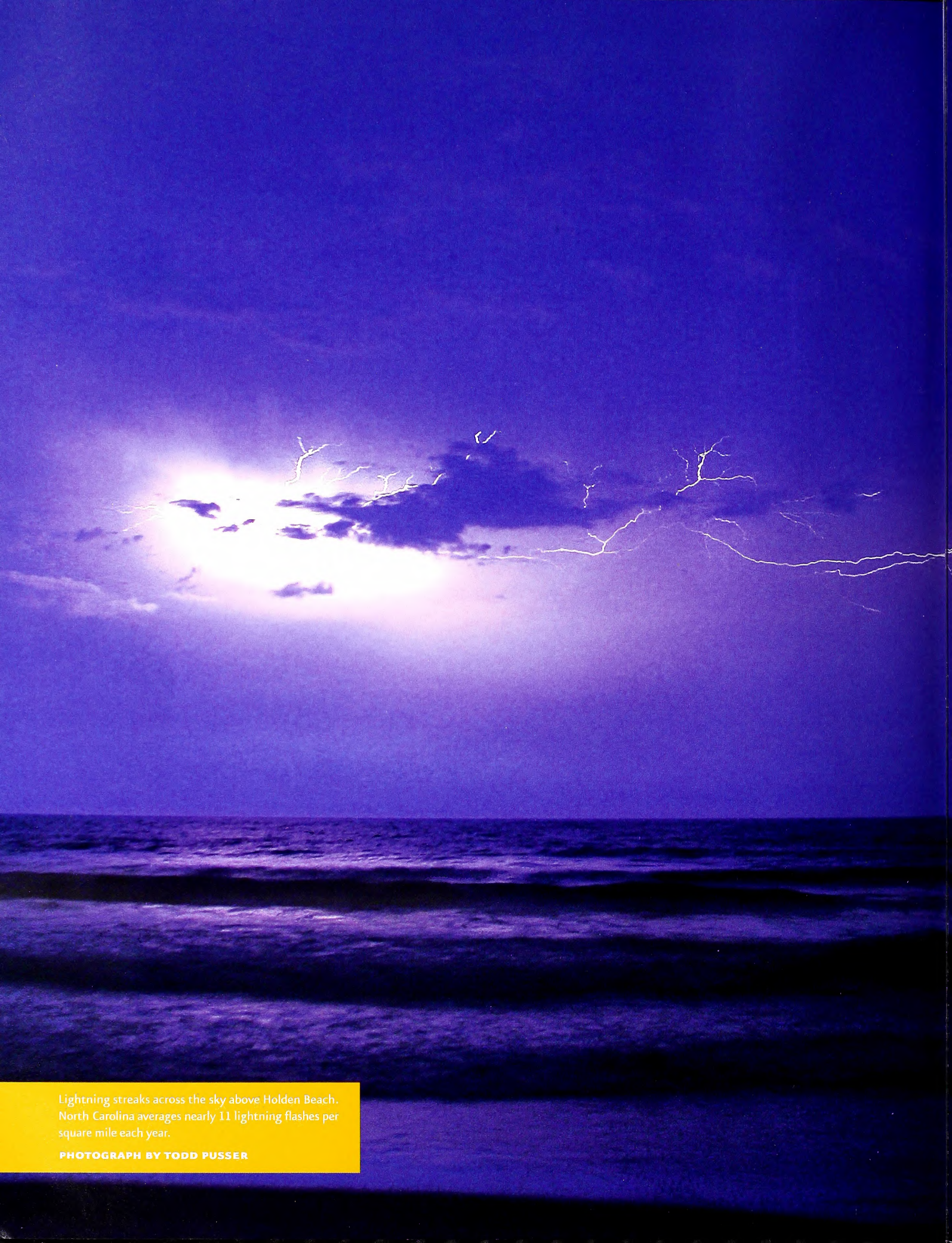
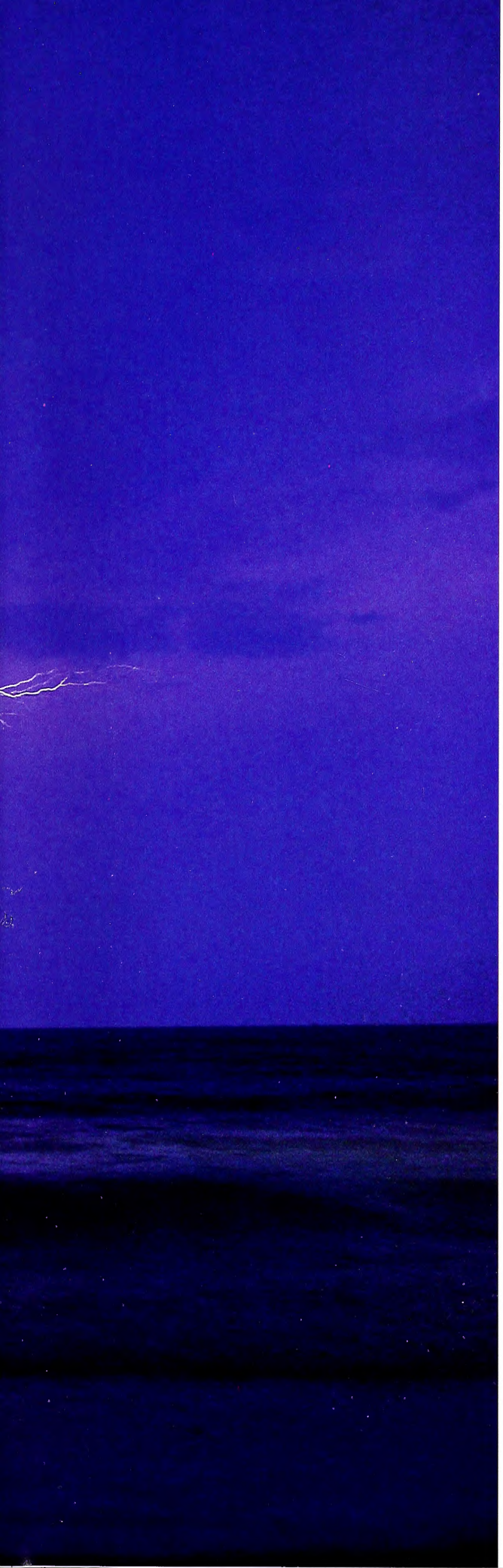




Lightning streaks across the sky above Holden Beach. North Carolina averages nearly 11 lightning flashes per square mile each year.

PHOTOGRAPH BY TODD PUSSER



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Cover: Reaching lengths of over 2 feet, the hellbender (*Cryptobranchus alleganiensis*) is among North Carolina's largest and most spectacular salamanders. PHOTOGRAPH BY TODD PUSSER.

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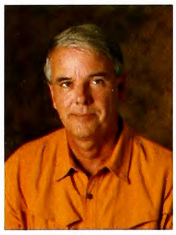

EDITOR'S NOTE

I live too much these days in books and dreams and remembrances. It is a life into which many of us descend, too easily acquiescing to the demands of the mundane.

Perhaps each generation believes it is busier than any other, and yearns for the slow days of its forefathers. That, I suspect, has always been true. It is easy to become tangled in insidious webs of working and getting and fail to pursue what rejuvenates us. For me this time of year, that's fishing, and the notion of seeing and touching running water perks about my brain without summons. It is then that I go to the river, just a little nearby river, but one where fish are plenty most days and seclusion is likely, but not guaranteed.

MELISSA McGAW/NCWRC

When May arrives, the fishing is good, the vegetation is lush and the water comfortably cool. Redbreasts will take flies on top of the water. It's a pleasant way to spend a few hours, out of touch with the everyday, finding what has been misplaced.

Last May after fishing and catching for a time, I noticed a string of seven or eight redbreast nests against the far bank. I climbed a large rock for a better view and sat beside what appeared to be raccoon scat on a patch of green moss. A 20-foot section of fallen log provided a bit of protection for the young fish as the males guarded the nests. Redbreasts predominate in this piece of water, but I have caught bluegills, largemouth bass and crappies here, all cousins of *Lepomis auritus* and all willing to eat a little fish.

After watching for a time the adult redbreasts darting out whenever another of its species swam past, I resumed fishing. The adults could have been easy pickings on the nest, but that seemed too simple. So I fished the darker, deeper water, hoping to stir another redbreast or a bass. "We seek for slumbering trout," Irish poet William Butler Yeats wrote, "And whispering in their ears Give them unquiet dreams."

If I gave the redbreasts unquiet dreams, that's the trade-off between fish and men. The incident of catch may linger with them, but who knows for sure what happens in a fish brain. I only know what happens in mine.

Jim Wilson

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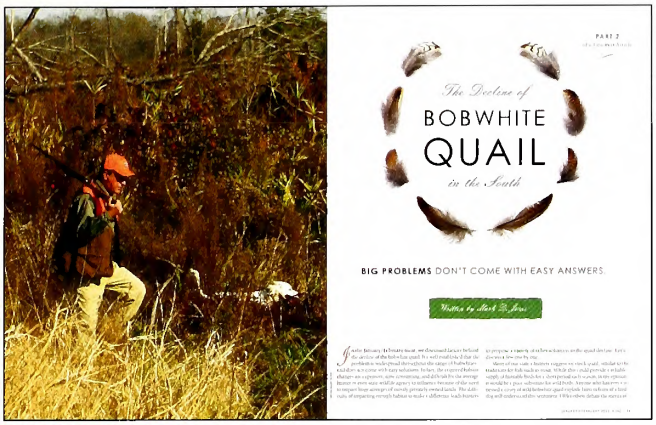

The Decline Equation

I read with great interest the latest bobwhite quail article, "The Decline of the Bobwhite Quail in the South," by Mark Jones (Jan.–Feb. 2012). Working where I do here at the National Bird Dog Museum, I can tell you that among the hundreds of visitors I see here in a year's time, the most oft repeated question I hear is, "What has happened to our bobwhite quail?" This same query comes from young and old alike. They pose many theories, and I have a couple of my own.

Being a kid of the 1950s and '60s myself, I have witnessed this decline and heard the lamentations it has produced among serious bird dog folks from all over. To somewhat counter Jones' slant on the problem, let me say this. Abundant quail were a by-product of the land-use changes that settlement brought to the South. We set the table for the bobwhite, and they and countless of their progeny dined for decades and decades, but it played out. Why? Jones talks about this, but he may have left out an important part of the decline equation.

We also for a long, long time gave bobwhites a safer environment to roam around in. We removed a lot of the predator species. Fifty years ago when we had abundant quail, the rural human populations lived on a patchwork of small farmsteads all over the region. Today, everyone has moved into town! But back then, everyone had a garden and a hen house — they eradicated any animal that competed with the household for those food sources. A shotgun leaned at the back door, and its purpose was to stamp out anything bothering the hen house or the garden. Skunks, weasels, raccoons, (and yes, hawks) were shot. I can tell you that I virtually lived in the woods and fields as a youth, and I never saw or smelled a skunk until I was 20 years old (that was 1971).

Research at the nearby Ames Plantation where 24-7 infrared camera surveillance observed active summer quail nests, indicated that 60 percent of destroyed nests were raided at night by skunks. In no particular order of magnitude, the remaining 40 percent were destroyed by raccoons and snakes. In south Georgia, research indicated three different top predators — opossums, armadillos and fire ants.

I have witnessed friends spending tens of thousands of dollars over a decade in attempting to manage 1,000 acre segments for bobwhites. No luck. But a plantation in Florida, where I interviewed the manager, said it maintained a good quail population by running a predator control program 365 days per year. This was over a land base of 20,000 acres.

So, I say all of this to make the point — the demise of the bobwhite apparently has diverse causes. But there is more to the issue than managing habitat. Nowhere did Jones mention depredation as a possible problem.

David Smith
Executive Director
National Bird Dog Museum
Grand Junction, Tenn.

As a retired wildlife biologist I would like to corroborate Mark Jones' explanation of the decline of bobwhite quail and add another very important reason for the decline. My take on the reasons for the decline:

- Increased size of farm machinery and different farming methods have replaced small family farms with their small crop fields and fence rows constituting excellent habitat, with mega-farming. The huge mono-crop fields of mega farms, with no fence rows, have essentially destroyed most quail habitat.
- Urbanization of society moved people off the land where they had lived on subsistence farms and raised poultry that they protected by killing hawks and owls. There is no longer any reason to kill avian predators because poultry are now raised in factories.
- Urbanization gobbled up thousands of acres of what used to be quail habitat.
- The numbers of egg-eating mammals such as raccoons, opossums and skunks that eat quail eggs has increased tremendously.
- Banning of DDT in 1972, added to urbanization of society, increased Cooper's hawks populations several hundred percent. Their diet is 70 percent birds, including quail.

What I would like to add is my conviction that avian predation, particularly by Cooper's hawks, is the primary reason why recent quail restoration efforts have failed.

Frank Barick
Raleigh

Return to Traditions

When my daughter was born I bought her a lifetime hunting license and a lifetime subscription to *Wildlife in North Carolina*. The magazine has changed a lot over the recent years, and admittedly I lost interest in the magazine a few years back when they went more "natural" and less hunting and fishing.

However, the photo contest always gets my attention so I picked the January edition and was pleased to also see something about quail hunting. I really liked the content of this edition and ended up reading the entire magazine, which is something I haven't done in years. With articles on quail and dog training, it sounds like the content is coming back to what I remember. I look forward to the next edition, and am now hopeful that my daughter will be exposed to the same types of articles that cemented my love for the outdoors growing up in North Carolina.

Jeff Tucker
Advance

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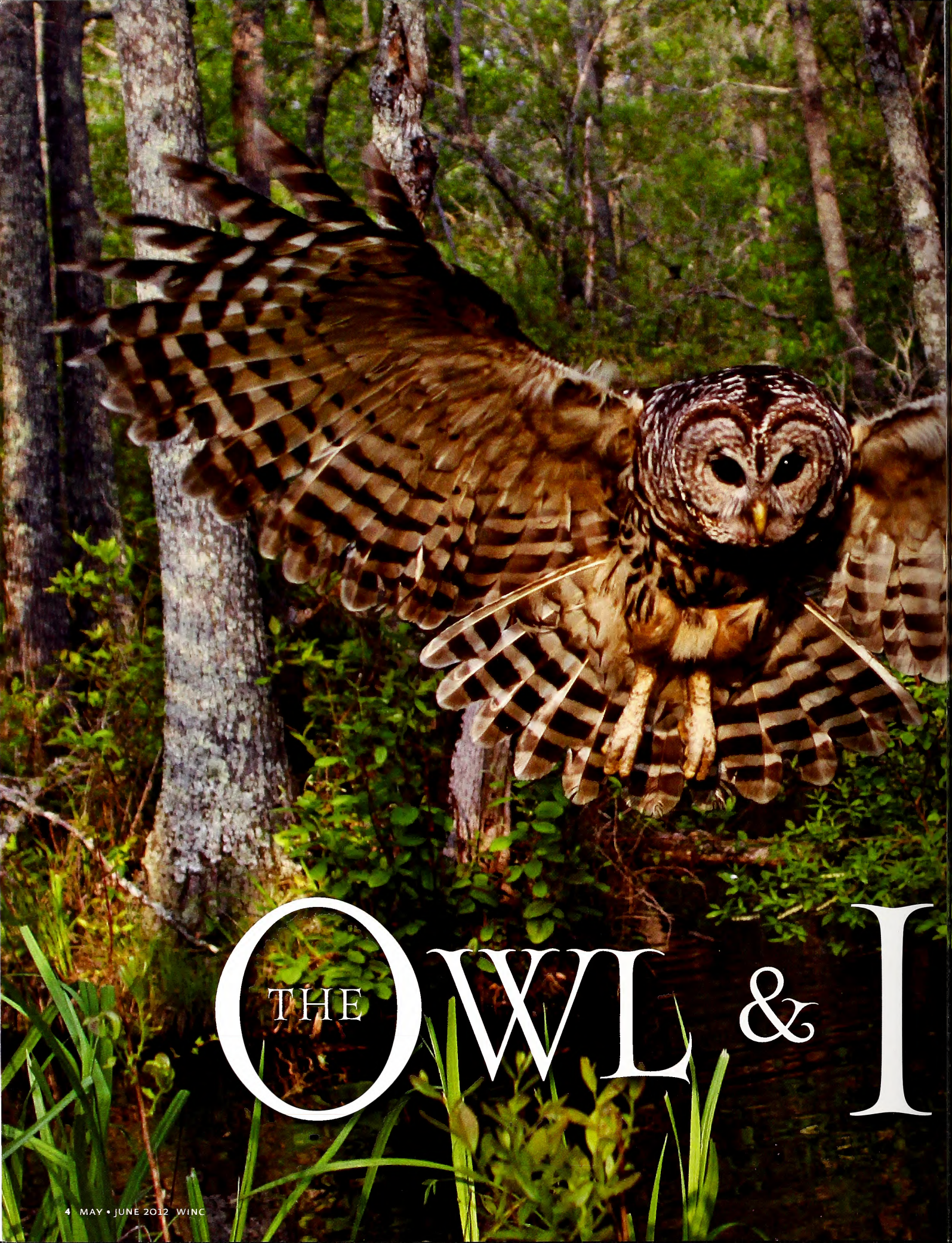
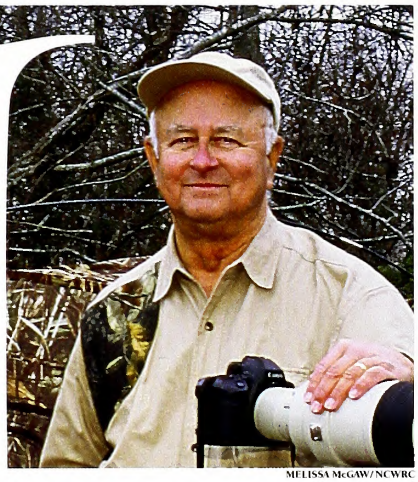


THE OWL & I

WRITTEN AND PHOTOGRAPHED BY F. EUGENE HESTER

What started as simple random sightings of a barred owl in a Johnston County swamp developed over four years into a remarkable relationship with this wild and beautiful bird.

They may make an unlikely pair, but both the author and this barred owl seem satisfied with the relationship that has developed over the past four years.



MELISSA McGAW/NCWRC

It was an early spring day four years ago, when new leaves were just beginning to appear on trees. As I fished in the swamp of an old millpond, I was startled when a barred owl suddenly flew by. It perched in a tree and looked around, then after a few brief moments it disappeared deeper into the swamp.

At times over the next several months I would see a barred owl flying through the swamp. Often in late afternoon we would hear them calling. On some days two or more of them would sound a chorus of their familiar call "Who-Cooks-For-You, Who-Cooks-For-You-All."

The following spring my son Tom, fishing in another boat in the same swamp, called me with his walkie-talkie. He almost whispered as he said, "Dad, there is a barred owl in a tree over here. He is really watching my fishing lure as I retrieve it across the water." An hour later he called again, this time to tell me that he had seen the owl fly into a hollow tree. "I think I just found the owl's nest," he said.

Over time our sightings became more frequent, and the owl acted as if it actually welcomed our trips. Then one day as I checked on nests in wood duck boxes, an owl surprised me by calling from a limb directly over my head. I began to wonder whether this owl was seeking me out and deliberately coming to visit.

How would an owl react to recorded barred owl calls, I wondered. To find out I carried my recorder on my next trip. Within a minute after playing the call, an owl flew overhead at tree-top height to check on what must have seemed like a visiting owl. At other times it would perch in a distant tree and continue searching for the mysterious visitor.

Over time if I played the recorded call, the owl would not only respond by flying to a nearby tree, it would call in return. Our visits were now beginning to include a conversation. The owl would lean forward, and with its throat feathers puffed out, make its familiar hooting call.

"That owl is mocking you!" my friend Bill Hinnant exclaimed. Perhaps it was a question of who was mocking whom, since I was playing a recording of an actual owl calling. Either way, our relationship was growing stronger.

I was pleased when one summer day two owls came to the call. Probably an adult with one of its young, I thought. They would sit nearby and call to each other and also call to my recording.

Over time it became unnecessary to use my recorded call. The owl would see or hear me as I moved through the swamp in my little boat and would fly to one of its favorite perches to wait. At other times it would fly directly over me as if leading the way.

What do barred owls eat, and could I feed this one? From the literature it was obvious that they were opportunistic feeders. They are known to feed especially on mice, voles, shrews, squirrels and other small mammals, but they will also capture small birds, snakes, lizards, grasshoppers, fish, crawfish and frogs.

A squirrel seemed like a good choice, so I took a recently killed one on my next trip. When I arrived the owl was already there, waiting on one of his favorite perches. A small island between several trees looked like an ideal place to throw the squirrel. When I threw it,

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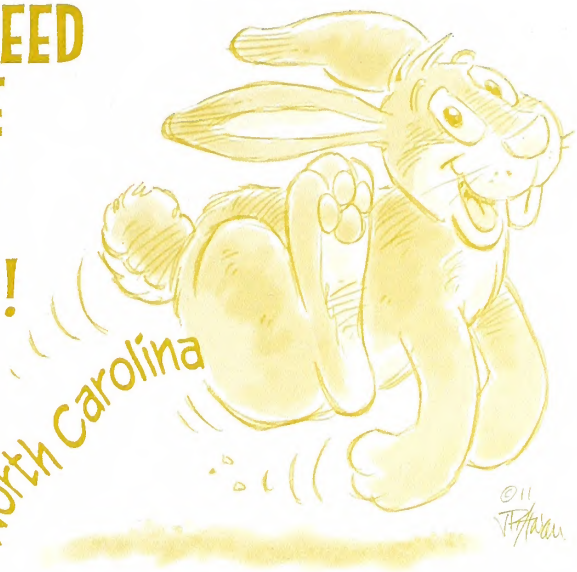

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the owl watched intently. The owl's complete attention was on the squirrel as it bounced onto the island. Though it continued to pay close attention, it gradually lost interest in the lifeless squirrel. Later, when I returned I found that nothing had taken the squirrel.

I tried a second day with another dead squirrel with the same result. It was becoming apparent that the owl wanted to catch its own live food.

I remembered that in past years, while fishing on another pond long after sunset, I had twice seen a barred owl fly to the water surface to capture a fish or other aquatic animal. Maybe a live, flopping fish could be the answer.

Fortunately golden shiners were abundant in this lake and usually easy to catch by normal fishing methods. My early attempts at providing a live fish did not go well. First there was a hole in the island, and as the fish flopped, it was amazing how quickly it could disappear and escape directly into that hole. Others flopped in the opposite direction and escaped by bouncing off of the island into the water.

Although the owl was very attentive to all of this activity, it still would not come after the fish, even when the fish did not escape. I did find, however, that when I later returned the fish would be gone. Did the owl get it after I left, or did a raccoon or other creature get it?

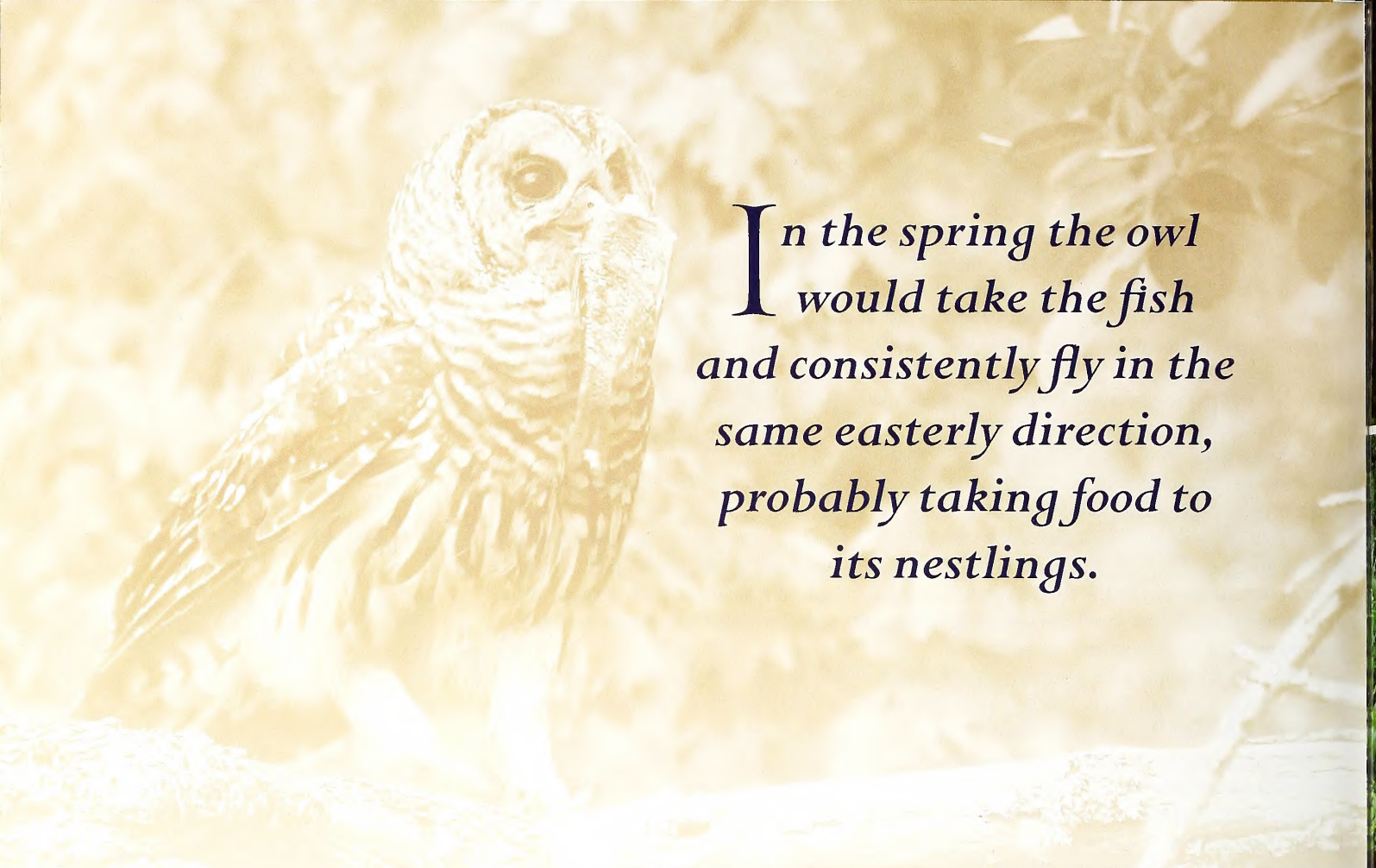
After plugging the hole in the island and adding small barriers to reduce chances that the fish could escape over the side, I continued to bring fish. Each time the owl intently watched every movement of the fish, and I became more convinced that it was waiting for me to leave before coming for it.

One day after depositing the fish, as I backed away I looked back and saw the owl swoop down and grab the fish! Now I knew for sure that it was only hesitant to come while I was close by.

From that day on, I started waiting away from the island, but each time remaining closer than the previous time. Over the next few weeks the owl lost all fear and eventually would come for the fish when I was only 5 feet away.

I had previously photographed the owl several times on its favorite perch. Now I was eager to get action photos as it swooped down on its prey. Some perches provided better photo opportunities than others. The best one was a leaning limb from which the owl could approach between the trees on the island. Also, the afternoon sun would be in the best position to provide good lighting.

On some days two or more of them would sound a chorus of their familiar call "Who-Cooks-For-You, Who-Cooks-For-You-All."



In the spring the owl would take the fish and consistently fly in the same easterly direction, probably taking food to its nestlings.

Before throwing the fish, if the owl was on a different perch, I would motion for it to fly to my preferred tree limb. I would swing my arm and call out "Go over there! Over there!" I was somewhat surprised to see that this often worked. But if it did not, I used a long fishing pole to gently tap the owl and prod it to move there. Soon the owl seemed to recognize where it needed to be before I would throw the fish.

It didn't take long for "Hootie" to learn where to perch in order to get his free meal of fish from Hester and other visitors to the swamp.

Even getting the fish to remain on the island and the owl to fly from the correct perch did not make the photography simple. The owl soon began to swoop down on the fish almost as soon as it landed. It was necessary for me to keep the boat in the right position, throw the fish, grab my camera and aim it in only a second or two. And I did not like grabbing the camera with a wet hand!

Eventually I learned to tie the boat in the best position and throw the fish with my left hand while holding the camera in my right.

By this time I gave the owl a name and began calling it "Hootie." Often Hootie would be waiting on his (or her) favorite perch when I arrived. If it was not there, it was no longer necessary to play my recorded owl call. Now I could just call out "Hootie, your dinner is ready!" Most times he would appear almost instantly.

After capturing a fish, Hootie would fly immediately over me so close that I could feel the breeze from its wings over my head. It would land, eat part of the fish, and then fly away with the remainder in the talons of one foot, or occasionally in its beak.

Sometimes if I waited several minutes after feeding him, Hootie would come back for another fish, repeating the entire process. In the spring the owl would take the fish and consistently fly in the same easterly direction, probably taking food to its nestlings. On one afternoon, the owl set a record by repeating this process for a total of five times. After the owl disappeared the first time toward what I believe was its nest, my nephew Rupert and I heard several owls calling from that direction.

"Listen to that!" Rupert exclaimed. "Just like at McDonald's, they are asking who wants another fish!"

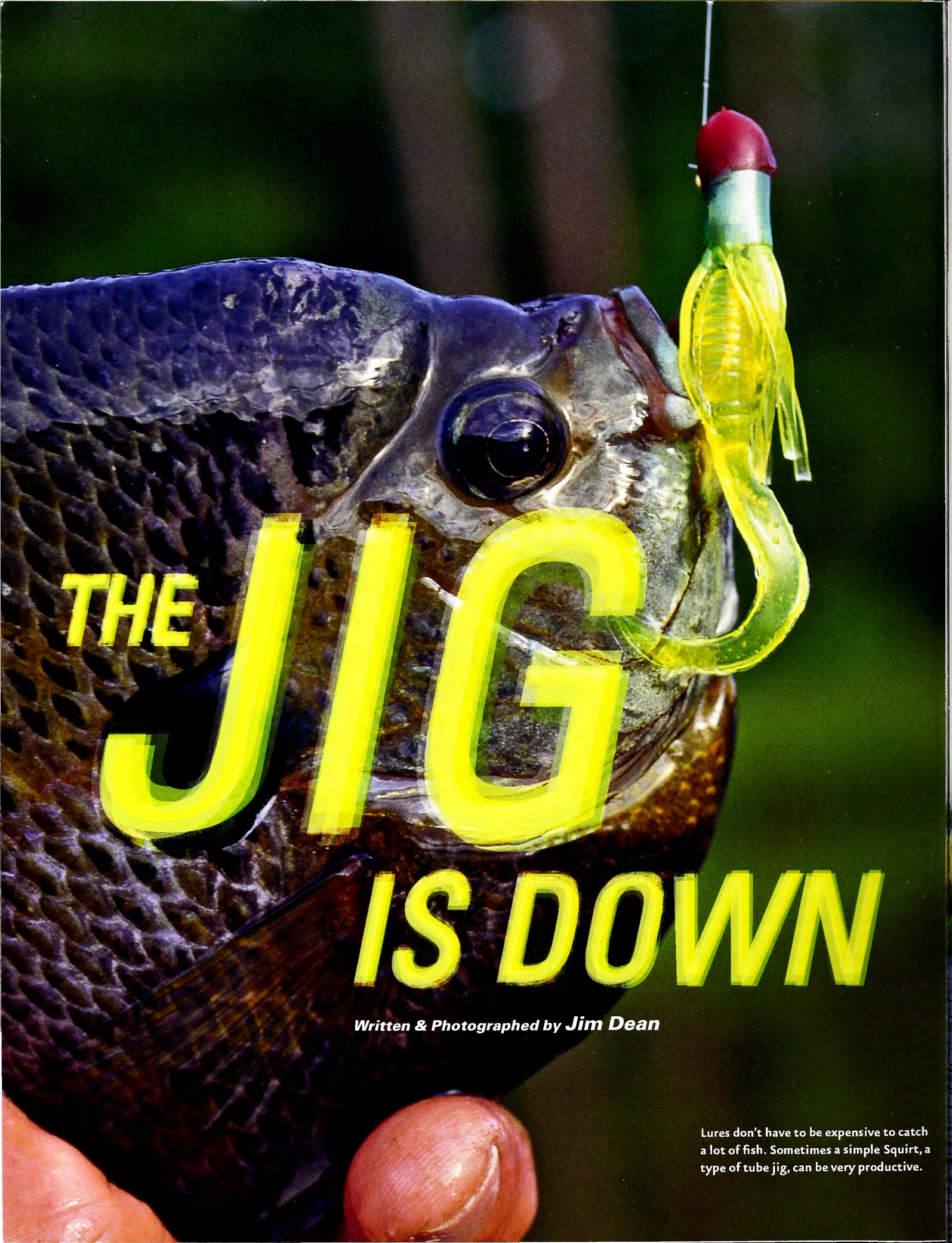
Getting a good photograph wasn't an easy thing to accomplish. Timing was critical, and both owl and photographer needed to be in the right position to get a perfect photograph.

I have 40 wood duck nest boxes on this lake, and many of them are in this swamp. One afternoon as I was inspecting the nest boxes, I realized that I would not complete my box checks before dark. So I stopped to feed Hootie. In the usual manner he grabbed the fish and after a few bites flew away, into the swamp.

I proceeded farther into the swamp checking more duck nests. It was now almost dark. As I was counting the eggs in one nest I was startled by a movement over my head, not 10 feet away. There was Hootie, perched directly over me. As soon as he saw that I recognized him, he flew back and waited for me at his perch beside the feeding island. He was finding me and leading me back for another fish!

I sat there reflecting on how over four years I developed a relationship with this wild and wonderful owl, and trained him to come to me for a fish. Then suddenly I realized that in reality it might be the other way around, and it actually had taken this owl four years to train ME to bring IT a fish!

Gene Hester, biologist, professor and administrator, is a frequent contributor to Wildlife in North Carolina.



THE JIG IS DOWN

Written & Photographed by ***Jim Dean***

Lures don't have to be expensive to catch a lot of fish. Sometimes a simple Squirt, a type of tube jig, can be very productive.

The only fish-getter I've ever seen that works better than a Squirt is likely to have a fuse sticking out of one end.

No matter how serious we are about our fishing, or how wrapped up we get with high-tech tackle, cutting-edge techniques and expensive forays to chase exotic species, there inevitably comes a day when it dawns on us that we're not always getting a very good return on our investment. We're doing plenty of fancy fishing, but we're not doing much catching.

My nearly foolproof remedy for this situation is to put the horse back in front of the cart. I'm hungry for action, and I'm more than ready to sacrifice the arcane arts and crafts of the sport for some fish—make that lots of fish. The tackle and methods I choose are simple, and experience has proven that they will also be successful. One rod, one lure and one relaxing afternoon on the water should be all it takes to recalibrate my priorities. That one lure, by the way, is a small soft-plastic jig popularly called a "Squirt."

I was introduced to these marvelous little lures one summer years ago when I was fishing with my old buddy Jack Avent on a small lake not far from my home in Raleigh. As usual, I had at least three or four casting rods and two spinning rods, but I had caught only two small bass while Jack was steadily cranking in fish using a single light spinning rod.

In addition to half a dozen decent largemouth bass—including one that pushed 4 pounds—he was also catching bluegills, shellcrackers, crappies and the random yellow perch. Some of the bluegills and shellcrackers he'd caught would nearly overlap a dinner plate. I am normally a generous soul, happy to share in the good fortunes of others, but I had enjoyed about all of this I could stand.

"All right, I give up," I barked. "Show me that thing you're using."

"Why there's not much to it," Jack allowed. "Just a little lead-head jig with a hollow

Obviously, this is not the kind of fishing that challenges an angler's lifetime of accumulated skills, but it certainly does rank high on the fun index.

soft-plastic head slipped over it that has sort of a wriggly skirt on the rear end. I added a soft curly tail. Fish seem to like it."

Indeed they did, and what also impressed me was that Jack had chosen to use light tackle instead of the heavy bait-casting gear he typically prefers.

"I just wanted to catch fish today without having to work very hard," he explained.

I borrowed a Squirt and tied it on my ultra-light spinning outfit. I have no idea how many fish we wound up catching, but for the rest of the afternoon, we were often hooked up at the same time.

Obviously, this is not the kind of fishing that challenges an angler's lifetime of accumulated skills, but it certainly does rank high on the fun index. Since that day, I have acquired lots of Squirts in many colors, along with the tiny lead jig heads designed to use with them. These diminutive lures work well even if you don't add a curly tail, but they're more deadly if you do.

I have been a fan of light and ultralight spinning ever since this gear first began to appear many years ago. Until I learned about Squirts, I typically relied on Beetle Spins, which are essentially small-bladed spinnerbaits with soft-plastic bodies. I also used in-line bladed lures made by Mepps and Panther Martin, along with various conventional lures in small sizes such as Rebels and Rapalas. Some popular top-water lures are also available in ultra-light sizes. All are great lures that should be part of any light tackle enthusiast's arsenal. But, for my money, a Squirt is hard to beat.

Squirts are particularly good for panfish such as bluegills and shellcrackers, but they will catch any game fish found in ponds, and they are also deadly for panfish, crappies, bass and most other species on bigger water. I have used them successfully for white perch, white bass, and even hickory and American shad. In streams and rivers, they are killers for everything from redbreast sunfish and Roanoke bass to smallmouths and pickerel, and because the hook point rides up, they are less likely to snag. I haven't tried them for rainbow or brown trout, but I believe they'd work great.

A handful of anglers are now even using them in salt water while fishing inshore holes and sloughs for gray and spotted seatrout, especially with those jig heads that have red hooks. It wouldn't surprise me to soon see lead-head Squirt jigs with stainless or plated hooks that won't rust.

If Squirts have any disadvantage, it may be that they aren't always the best choice for water much deeper than a dozen feet or so because they are small and relatively light. Crappie fishermen, however, have developed some tactics with Squirts that work well on big lakes. They fish them with a normal cast and slow retrieve when crappies are shallow or along the shoreline (a typical spawning pattern in early spring). However, when crappies are deep, fishermen often rig them beneath a float that allows the Squirt to slide freely until it reaches the desired depth where it is held there by a stopper (usually a knotted rubber band). The stopper knot can be moved up or down the line to vary the depth you want. This keeps the Squirt in the strike zone where your depth finder has indicated there may be schools of crappies. This deadly tactic was developed years ago using small jigs that have marabou feather tails for species that are suspended or holding around structure, and it also works well with Squirts.

The soft-plastic Squirt bodies have a hollow head with wriggly appendages at the rear (sort of like a squid). They come in dozens of solid and multi-toned colors, and can be bought in packages of single or mixed colors. Most are 1 1/2 inches long, but some colors are available in a larger 2-inch length. The Squirt tubes, jigs and curly-tailed grubs are sold separately, but can usually be found together in tackle stores. The most popular-sized jig head is 1/16th of an ounce, but 1/32nd and 1/8th ounce heads are also available. The small curly-tailed grubs also come in lots of colors.

Because Squirts don't come assembled, you have to do it yourself, but the process is quick and easy once you get the hang of it. It may help to wet the jig head with saliva first, then slip the open end of the hollow soft-plastic Squirt tube over the lead jig head and work it down until it covers the jig head. You may have to wiggle the Squirt head a bit to get it fully seated, and I find it helps to hold the Squirt at an angle as I'm sliding it onto the jig head to keep it from snagging on the upturned eye of the hook. Once seated, the eye of the hook will easily penetrate the side of the Squirt when you push against it. Then, you pull the wriggly appendages aside, and attach the curly-tailed grub. I often bite off a bit of the fat front portion of the grub to get a better, more streamlined fit.

There are so many colors and combinations available that you may wonder which to choose. It's hard to beat a solid white or silvery-gray sparkle body and curly tail for crappies, but some fishermen like a red or black head. I find it hard to beat chartreuse for most species, so I'm most likely to combine a curly-tail of that color with a Squirt body that has chartreuse appendages and either a green, black or red head.

The Squirt and other soft-plastic jigs are versatile lures that come in many colors and sizes. They can be used to catch species in small ponds as well as bigger waters. Some anglers have even used them in salt water.

Even so, I have successfully used many other color combinations, including speckled pumpkinseed, and I like dark colors such as black or blue in murky water.

A slow, steady retrieve that keeps the curly tail quivering is often best—not too fast or the lure may twirl. I also often give the lure an intermittent hopping motion, pausing occasionally to let it sink. In deeper water, I will let it sink awhile before I begin my retrieve, and if I consistently find fish at a certain depth, I'll use a countdown to get the Squirt where I want it.

My favorite rod for Squirts is a light 6-foot graphite spinning rod designed for 4- to 6-pound test monofilament (I prefer 4-pound test because it's a perfect match for the 1/16th-ounce jigs I typically use). I also have an old soft-action 5 1/2-foot fiberglass ultralight rod that's fun to use. If you're catching bigger fish, you can switch to 6-pound test, but it won't cast as well, and heavier lines aren't really suitable.

My preference is for open-faced spinning reels that are a bit larger than those that are truly tiny, because their spools are so small that you can't get a faster retrieve when you might need it, and the inevitable loops and tangles you're going to get due to line twist are harder to pick out.

There aren't many artificial lures that will reliably catch fish virtually year round, and even fewer that produce hot fishing during those torrid summer months when a heaping cone of ice cream will be dripping off your elbows before you can get it licked.

But that's an especially good time for a refreshing little Squirt. ◆

Jim Dean is the former editor of Wildlife in North Carolina *and writes the "Our Natural Heritage" column for each issue.*

Tying One On

Marty Shaffner was brimming with enthusiasm. "You should see these poppers," said Shaffner, who operates Tri-State Anglers Guide Service in northwestern North Carolina. "They are some of the best ones I've ever seen for fly-fishing."

Not long afterward, I obtained some of those poppers, created by Anthony Hipps of Lexington. And they are indeed fishy looking, with their soft foam heads, spider-like appendages, hair-sprouting midsections, tail feathers and two appendages emanating from the tails. But before going into details on their creation and how to use them for North Carolina's warmwater game fish, let's discuss why anglers should participate in the art of fly-tying.

Written by
BRUCE INGRAM

Photographed by
MELISSA McGAW

Lexington's ANTHONY HIPPS tells how to make his soft-bodied poppers—and how to fish them.

Why Tying Your Own Makes Sense

Anthony Hipps is a 46-year-old senior product chemistry specialist for Syngenta. He almost waxes poetic when asked about the advantages of tying our own.

"There's something special about a fly-fisherman catching a fish on something he himself has tied," Hipps said. "But there's a practical side as well. Fly-tying gives us the flexibility to use our creativity to design just the pattern we need. When we don't exercise that imagination, there are limits to what we can do in order to catch fish."

Hipps lists these other reasons as well:

- To keep in touch with fly-fishing even in the depths of winter.
- To relax. ("When I tie, which is usually at night after work, I start to think about the great fishing trips I took the summer before and where I'm going next spring and summer," he said.)
- To more accurately match insects and invertebrates that we have observed on streams.
- To save money, as many store-bought or ordered patterns run $5 or more.

The Lexington sportsman, who has been tying since he was 8 years old, explained how his soft-bodied poppers evolved.

"Back in 1996, I was fishing for trout on Helton Creek, which is a tributary of the North Fork of the New River in Ashe County," recalled Hipps. "The trout fishing wasn't any good, but earlier when I had passed by the North Fork, I saw all these smallmouths feeding on damselflies and minnows. So I decided to return to the North Fork."

"I didn't have my regular smallmouth fly boxes, but I scrounged around and came up with three standard Size 8 panfish balsa and cork poppers. Two of them fell apart after I caught three or four smallmouths, and the other one exploded when I cast it up against a rock. I was really frustrated with the durability of those flies—that's when I decided it was time to create my own."

Early Attempts

Hipps' first attempts involved patterns that looked much like the standard rubber spiders that are so effective for panfish. But they lacked that "popper action," that is the violent displacement which occurs when an angler makes a fly pop and spurt water. These creations also were not as long lasting as Hipps desired.

Finally in 1998, he hit upon the concept of building a fly around a soft foam body, and by 2001 he had devised the prototype for the pattern in existence today.

"I can easily tie a popper built upon a hook and give it a first painting in five minutes or less," Hipps proudly says. "The next morning after the fly has dried overnight, I can give it a final paint job. So in less than 10 minutes tying time, I can create one of my poppers. And they are a lot cheaper than store-bought ones."

The Hipps Soft-Bodied Popper: An Overview

Here is an overview of the materials needed for tying the Hipps Soft-Bodied Popper, as well as the basic step-by-step process.

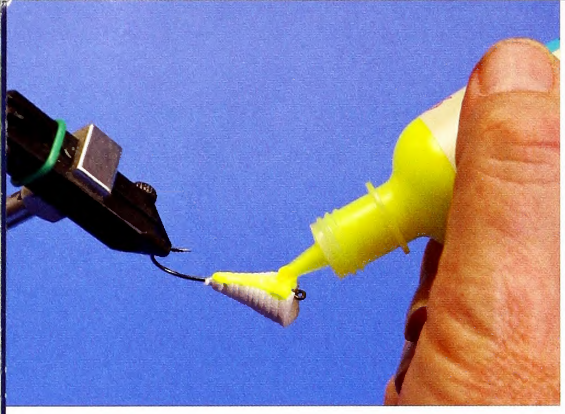
Materials needed

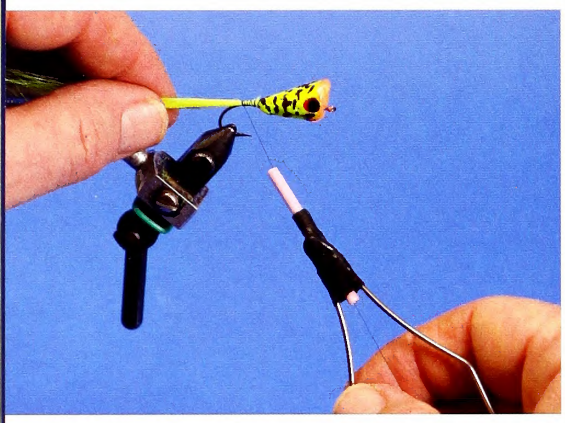
- Hooks: Size 4 and 6 Mustad 33903 (kink-shanked fly tying hooks).
- Thread: 6/0 Uni-Thread or equivalent in white.
- Tail: Synthetic or natural fibers: Flashabou, crystal flash, calf tail, hen or rooster feathers and others.
- Skirt: Neck or saddle hackle: color to match or contrast with body and tail.
- Body: Closed cell craft foam: 2mm, white.
- Legs: Round rubber: color to match or contrast with body.
- Other: 3-D craft fabric paint, water-based polyurethane gloss for the finish, Super Glue.

Very Basic Step-by-Step Instructions:

- Build the underbody using various-sized strips of closed-cell foam.
- Brush on Super Glue.
- Install the closed-cell foam outer shell of the popper body to give it a popper shape.
- Paint the body with 3-D fabric paint and let it dry for at least 2 hours, perhaps more on high humidity day. (Everything Hipps uses is non-toxic.)
- Varnish (either brush-on or dip, Hipps prefers the latter) the closed-cell foam popper body using your choice of colored fabric paints.
- Add the tail materials and the hackle collar.
- Sew rubber legs through the body to give the lure additional action in the water.

Of course, there is much more to the instructions than these basic steps, as fly-tying can be as simple or as complex as an individual desires. For the complete step-by-step





It takes about 18 steps to complete a soft-bodied popper. The materials are relatively simple and include a size 4 or 6 Mustad kink-shanked hook, closed-cell craft foam and 6/0 Uni-thread. Soft-bodied poppers, Hipps says, are easier to build than other poppers and are more durable.

instructions, go to the Warmwater Fly Tyer website: warmwaterflytyer.com/corner.asp?page=4. All in all, this link lists the 18 detailed steps of building a perfect popper. These steps originally appeared in Hipps' article in the summer 2006 issue of *Fly Tyer Magazine*.

A Day at the Vise with Anthony Hipps

Hipps recently visited my family's home so I could observe his fly-tying expertise and we could go on a fishing trip to the New River. The first night of the sojourn, my family and I watched him build one of his poppers and experienced vicariously his enthusiasm for this passionate aspect of his life. He gave us a step-by-step account of what he was doing.

But I have never been any good at following oral instructions, as I learn best by doing things myself while simultaneously receiving guided assistance. And as someone who has never done any fly-tying, I was hesitant to begin on my own. So on the morning before we headed for the New, I asked Hipps, who frequently teaches classes on fly-tying, if he would help me create one of his soft-bodied poppers.

"You have one thing going for you and one thing against," said Hipps as I sat down at the vise. "It is always easier to teach someone who is a beginner than someone who already feels like he knows how to build flies. On the other hand, you have 'man hands.' Many women seem to have a better touch, a delicate touch, for this type of thing than men do. I see this over and over again in my classes."

I soon found out what Hipps meant. As he was teaching me how to use a bobbin to spool off thread so that it could be used to help attach the closed-cell foam to a Mustad hook, I felt as if I were the proverbial ham-handed man. After several false starts, including my wrapping the thread both too close and too far apart at times, I was able to finish this step of the process.

However, I also noticed that there seemed to be "bumps" in the cell foam where I had glued and threaded the foam sections together. Later, after I had applied paint to the body, I further observed that there seemed to be bulges in the paint job. Hipps was too kind to say anything about my initial efforts. Although my fly was not aerodynamically sound or as aesthetically pleasing as I would have liked, I had succeeded in creating my first one—and was intrigued enough to want to attempt more.

For the complete step-by-step instructions, go to the Warmwater Fly Tyer website: warmwaterflytyer.com/corner.asp?page=4.

A Day on the New River with Hipps and His Poppers

"In the summer, there are all kinds of places to fish poppers for smallmouths in North Carolina," said Hipps as we prepared to drive to the New River. "Besides the New, I like both the South and North Forks of the New and the Pigeon, Uwharrie and Mitchell rivers. But I also really enjoy fishing poppers for largemouths on our lakes like Tillery, High Rock and Badin. If you really want to have fun with poppers, go to a farm pond and use them for bluegills."

Once we began our excursion, I soon realized that Hipps retrieves his poppers more aggressively than many if not most fly-rodders. For example, the previous week I had floated the French Broad River and the first fly tied on was a Sneaky Pete popper. The guide praised me for allowing the Sneaky Pete to rest motionless for long periods of time, proclaiming that too many fly-fishermen work top-water patterns too assertively.

"A dead drift can be a great tactic for a popper," counters Hipps. "And, of course, we have to experiment with retrieves to find out what the fish want on a certain day. But on many days, I like to give two or three light twitches to a popper after it lands. And on many more days, two or three aggressive pops can really bring up the fish."

Not long after this explanation, Hipps smartly snapped off several quick pops, and a New smallie smashed the fly. After he released the bass, Hipps continued with the lesson.

"Notice where that bass was holding?" he said. "Right at the edge where the shadow

BRUCE INGRAM

BRUCE INGRAM

Hipps' Tips for Gearing Up for Popper Fishing

Reel: Any single action reel that will hold 50 yards of backing.

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Rod: Medium action 6- to 8-weight (flex in this rod makes it easier for anglers to cast poppers). "A popper has a lot of wind resistance and it goes through the air 'face' first," explains Hipps. "The flex in this type of rod helps turn the popper over a little easier."

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Line and Leader: Weight forward bass-bug taper floating line with a 4x tippet (6 lb. test). For bigger or more turbid rivers or lakes, use 2x (12 lb. test) or 1x (14 lb. test). However, Hipps warns that heavier tippet sizes such as 1x can potentially inhibit the popping action. Don't use fluorocarbon line as its heaviness can kill a popper's action.

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Popper Sizes: Use Size 4 for largemouths, smallmouths, and rock bass. Use Size 6 in very clear water. Go down to Size 8 for bluegills and other sunfish.

from those trees end and the open water begins. On their first cast, many people will throw their flies all the way to the bank—that's a big mistake because fly-line landing on a fish will spook it. Work the shadow line first, then slowly work your way to the bank and its cover."

"On rivers and lakes, wood cover like downed trees lying parallel or at an angle to the shoreline can be true big bass places. So can shaded, undercut banks, edges and points of grass beds, and banks with rocks or riprap. Also, always be on the lookout for odd ball places to fish like sandbars. Sometimes you can catch bass that have herded minnows up on bars. On our rivers, I really like to cast to water willow beds and eddies above and below rapids and riffles."

We then paddled the canoe to a cut in the shoreline where the shade extended quite a ways out from some sycamores and box elders. I cast a popper to the shade line, imparted several quick snaps, and thrilled to an approximately 14-inch-long smallmouth blasting the pattern—and then spitting it out.

Extremely disappointed, I once again looked to Hipps for a lesson. "You made an error that too many people commit," he explained. "You had too much slack in your line when you set the hook. When a popper lands, quickly take up line so as all slack is removed. Then when a fish strikes: do the strip and snap routine, make a quick strip of the line and snap the rod to set the hook."

Shortly afterwards, Hipps implemented the strip and snap retrieve when a nice bass engulfed the popper. A few minutes later after the smallmouth shed its watery bonds a few times and after I took a few quick pictures, Hipps released a fine 14-inch bronzeback.

Several hours later we arrived at the take-out, and Hipps probably saw me staring enviously at his box of soft-bodied poppers while we were unloading the canoe. Heck, I probably subconsciously was hoping he would see me gawking at his brightly hued patterns. Hipps then kindly gave me several patterns. I think I'll use them (before the one I created) on my next visit to a favorite body of water.

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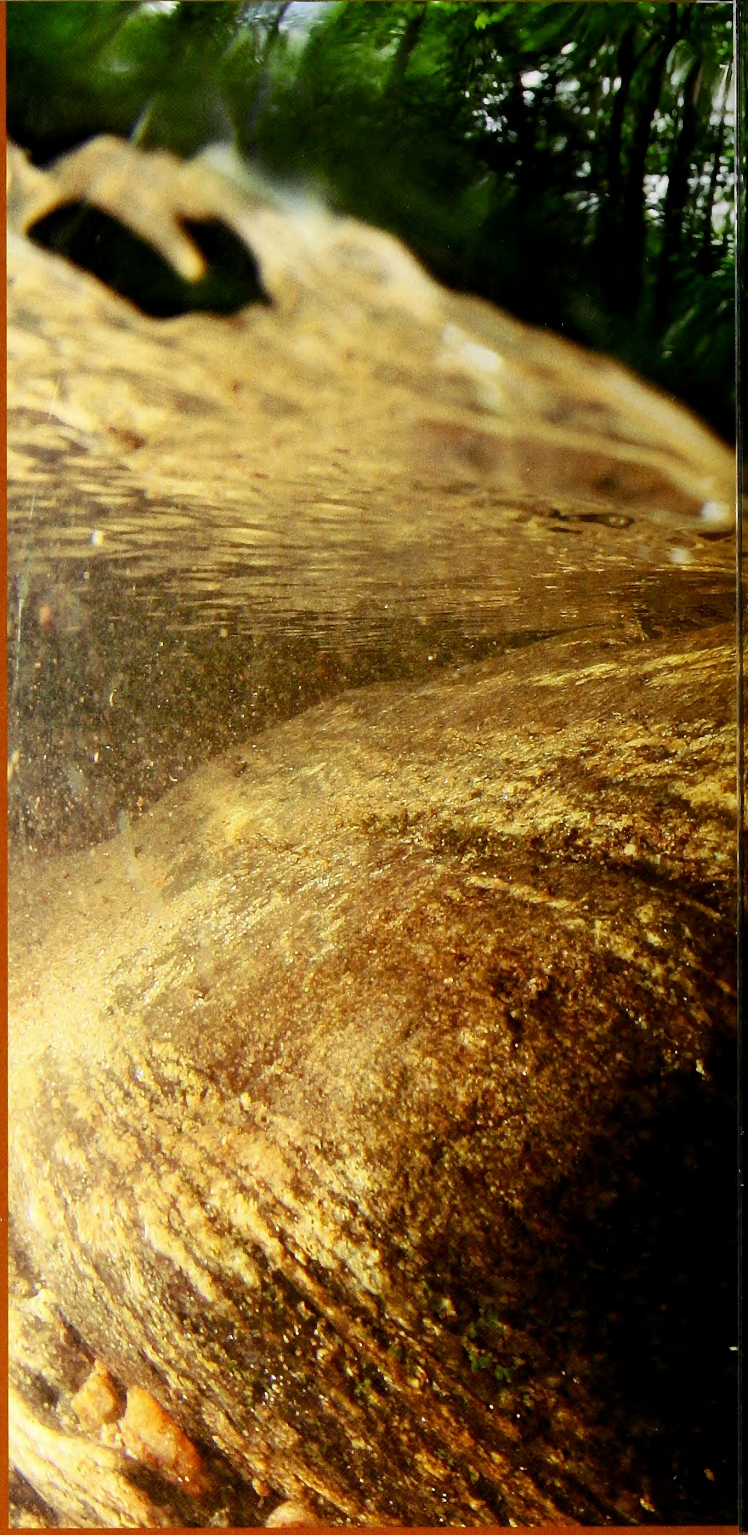
EVEN IN A STATE FAMED FOR ITS SALAMANDER DIVERSITY, THE SNOT OTTER STANDS OUT.



Some things stick in your mind. That day on the Watauga River near Boone in April of 1982 was well over half my life ago, but I remember it well. I remember the guys in my herpetology class at N.C. State (no idea where most of them are today), and the half-eaten whip-poor-will I found on a rock in the river (a mink's dinner, maybe, I speculated). But mostly, I remember why Wayne Van Devender took us to that spot. While some sought sundry small salamanders along the river bank, Van Devender, a professor of herpetology at Appalachian State, and one or two others waded midstream with a heavy rake and a large dip net. Soon their net was straining under the weight of a creature I had previously seen only in books. Nearly two feet long it was, writhing and slime-coated, with gray-brown wrinkled skin, stumpy limbs, a large flat head and tiny eyes. God, it was beautiful.

Also known as "waterdog" and "mudpuppy" (these two names correctly apply to another, unrelated salamander group), "snot otter," "devil dog," "Alleghany alligator" and some even less elegant names, the Eastern hellbender (*Cryptobranchus alleganiensis alleganiensis*) is one of North America's most spectacular amphibians. The origin of the term "hellbender" is unclear. It also refers to a drunken binge. Since some have traditionally regarded hellbenders as impossible, nightmarish creatures, perhaps the name arose in reference to something best visualized only during alcoholic delirium. Even the occasional herpetologist apparently finds hellbenders less than appealing.

When the first edition of "Amphibians and Reptiles of the Carolinas and Virginia" was published in 1980, the hellbender account began: "Ugly, slimy, and large best describes this grayish brown salamander." When, nearly 30 years later, fortune dictated my working on an updated second edition, one of my very first revisions was replacing those first three adjectives with "impressive." Because while hellbenders are indeed large (as salamanders go) and slimy (like most other amphibians, fishes and many people I've known), the idea of humans calling other species ugly was just too ironic for me. And because impressive is just what hellbenders are.

Hellbenders inhabit clean, cold rivers and larger streams. The eastern subspecies originally ranged from southern New York to extreme northern Georgia, Alabama and Mississippi, and westward into Missouri and southeastern Kansas. A separate subspecies,

HELLBENT

WRITTEN BY JEFF BEANE

PHOTOGRAPHED BY TODD PUSSER

the Ozark hellbender (*C. a. bishopi*), inhabits the Ozarks of Missouri and adjacent Arkansas. In North Carolina, hellbenders originally occurred in most larger streams in the French Broad, Hiwassee, Little Tennessee, New and Watauga systems. In the east, hellbender habitat has shrunk considerably.

Fully aquatic, they never willingly leave the water. The name Cryptobranchus literally means "hidden gills." Larval hellbenders do have small visible external gills, but by the time the salamanders are four or five inches long, the gills become covered by skin and are evident only by a small slit on each side of the head. A hellbender breathes mostly through its skin; the folds and wrinkles provide abundant surface area for oxygen exchange.

The largest hellbender on record measured just over 29 inches, but lengths of 12 to 20 inches are more typical. Although the hellbender is occasionally touted as North America's largest salamander, the two-toed and three-toed amphiumas (*Amphiuma means* and *A. tridactylum*) and the greater siren (*Siren lacertina*) all grow considerably longer. Even the lesser siren (*S. intermedia*) may challenge most hellbenders in terms of length. Hellbenders, however, are proportionally heavier and bulkier than any of these more slender, eel-like salamanders.

In most salamanders, breeding is accomplished by males packaging sperm in neat capsules called spermatophores. These are picked up by the females—a sort of indirect internal fertilization. Hellbenders, however, spawn externally, in the same "primitive" fashion as most fishes: the female lays eggs and the male dumps sperm over them. They are the only North American salamanders known to employ this old-fashioned spawning technique, though it could also occur in sirens, whose reproductive biology is poorly known ("Siren Song," April 2008). In late summer— usually about the first week of September in our area —male hellbenders select a large rock, clear a depression beneath it, and try to entice one or more females in to deposit their clutches of up to 200–400 grape-sized eggs. The male will defend his nest rock, guarding the eggs until they hatch (and sometimes for a while afterward) from would-be predators, which often include other hellbenders. In healthy populations, many males bear bite scars from fights with rivals.

Hellbenders seldom attempt to bite when handled by humans, but on those rare occasions when they do, it's noticeable. A zookeeper in Ohio reportedly lost a fingertip to a large captive hellbender while hand-feeding it night crawlers; the animal mistakenly seized his finger and spun, crocodile-style, shearing off the tip. N.C. Wildlife Resources Commission biologist Jeff Humphries was able to provoke a bite that produced a laceration completely encircling his finger.

Hellbenders are declining throughout their range. They face a mountain of threats. The greatest is undoubtedly poor water quality, mostly due to siltation resulting from agriculture, logging, urbanization and other land-clearing activities. Chemical pollutants, including some pesticides that may act as endocrine disrupters, are also a threat. So are dams. As hemlocks fall to the introduced hemlock woolly adelgid, streams whose banks were shaded by these trees may see deadly temperature increases. Chytrid fungus and perhaps another disease have hammered the Ozark hellbender. Even though hellbenders make poor captives, some populations may have been impacted by collecting for the pet trade. And some anglers still illegally and unethically torture and kill hellbenders out of fear, ignorance or belief that they are trout predators.

Female hellbenders lay 200–400 eggs in depressions created by adult males under large flat rocks in clear mountain streams. Once the eggs are fertilized, males will guard them for over two months until hatching.

Ironically, it's the other way around—brown and rainbow trout, muskellunge and other non-native fishes represent yet another threat to hellbenders. Hellbenders actually eat mostly crayfish. They also take aquatic insects, worms and amphibians—including smaller hellbenders. Rarely they may eat small fishes, or dead ones, and may even attempt to scavenge fish on a stringer. But they don't take healthy trout, and are in fact excellent indicators of stream quality. Most of the best trout streams in the Appalachians also support hellbender populations.

The Eastern hellbender is listed as a species of special concern in North Carolina, and is similarly protected in most other states where it occurs. The Ozark hellbender, its populations down over 75 percent, was very recently listed as federally endangered.

But even hellbender awareness and appreciation can be a double-edged sword. Enter yet another potential threat: "field herpers" (herpetologists) who may not necessarily want to collect hellbenders, but touch and photograph them, and who, thanks to internet forums, know exactly where to go to find them. Handling can stress or injure hellbenders, and technically these enthusiasts, though usually well-meaning, are breaking laws by handling them without permits. More importantly, those who would seek out hellbenders typically do so by lifting large submerged rocks. It's now known that certain rocks serve as long-term nest sites or other refugia, and that lifting them may disturb the underlying substrate just as a hurricane might damage your home or mine.

"I'm glad a lot of folks are interested in seeing hellbenders in the wild, but repeatedly

With their mottled brown coloration, hellbenders are able to blend in perfectly with the rocky substrate of a mountain stream. The author uses a clear Plexiglas viewing bucket to help find hellbenders resting on the bottom of a North Carolina river.

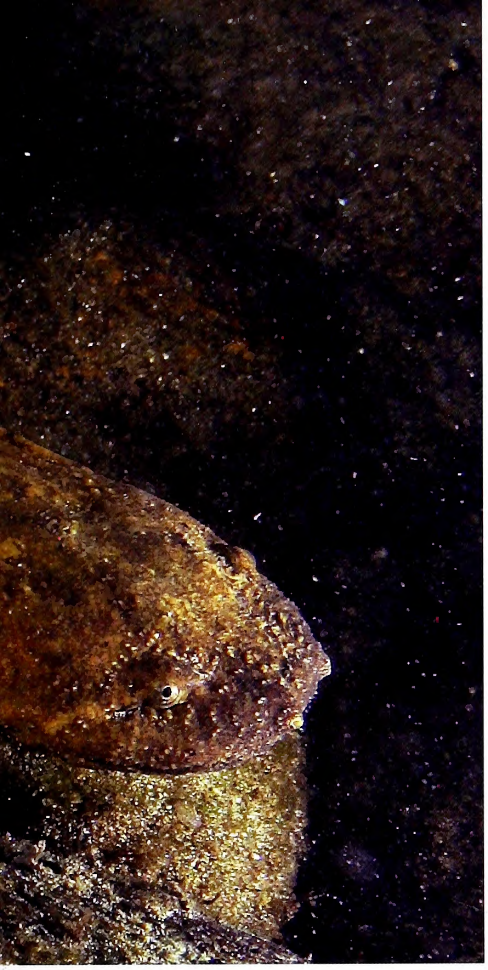
BUT EVEN HELLBENDER AWARENESS AND APPRECIATION CAN BE A DOUBLE-EDGED SWORD. . . . "FIELD HERPERS" (HERPETOLOGISTS) WHO MAY NOT NECESSARILY WANT TO COLLECT HELLBENDERS, BUT TOUCH AND PHOTOGRAPH THEM.

Hellbenders are declining in number throughout their range. Biologists continue to monitor the population and health of North Carolina's hellbenders in an effort to ensure the survival of these incredible salamanders for generations to come.

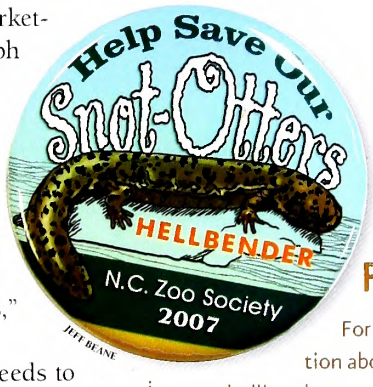
visiting the same few streams and lifting lots of big rocks can really damage the habitat," Humphries said. Hellbenders actually spend much time foraging in open water, and can be enjoyed without habitat damage, and with far less expended effort, by simply wading and looking. This can be particularly effective at night with a good light, but they may also be seen during the day, especially at sites with healthy populations. Polarized sunglasses help, and a Plexiglas-bottomed viewing bucket can facilitate spotting and photographing them underwater. Snorkeling with a mask is another good way to see them, along with numerous other underwater creatures. Once I even spotted a hellbender from a riverbank without even having to enter the water. Moving large rocks to look for them is probably justifiable only during focused surveys in streams where hellbenders are uncommon or unknown, and even then it should not be undertaken during breeding season.

Hellbenders do have a few things going for them. One is longevity—captives have lived for nearly 30 years, and some biologists believe they can live much longer than that. Long-lived animals can cope with years of reproductive failure (what they cannot withstand are steady losses of breeding-age adults). Another plus is the number of river miles that are still relatively clean and pristine. Big, grotesque salamanders may not seem important to everyone, but clean water is. The many agencies and private groups working tirelessly to keep our waterways healthy are friends to hellbenders and to everything else dependent on water—which is, well, everything.

Finally, there are those passionate about the creatures themselves. For years, Humphries has worked to gather basic hellbender population data and natural history information, and to educate the public about the value and plight of these animals. Lori Williams, another of the commission's wildlife diversity biologists, and project partner John Groves, curator of amphibians and reptiles at the North Carolina Zoo, have searched for new hellbender populations and monitored existing ones for the past five years, assisted by a strong team of volunteers. Williams anticipates another five years of general surveys before transitioning into a more standardized monitoring scheme or more applied research. In 2007, Groves and the



Zoo's non-profit support group, the N.C. Zoo Society, initiated a "Save the Snot Otters" campaign. Graphic design and marketing students and faculty at Randolph Community College contributed with the creation of "Snotty," a hellbender mascot costume worn at river festivals and educational events. "These efforts reflect the Zoo's commitment to elevate amphibians to the forefront of its conservation and educational goals," said Groves.



JEFF BEANE

"The main message that still needs to get out there," said Williams, "is about hellbenders' protected status, their role as indicators of stream health and the fact that they need the same high-quality stream conditions that trout need and vice-versa. Of equal importance, we need to urge people to leave them alone."

"They're large, unique, really cool animals; important predators and water quality indicators," said Ed Corey, inventory biologist for N.C. State Parks. "What's not to like about them?" Every July, Corey hosts "Hell Week"—several days of intensive monitoring of the hellbender population in New River State Park in Alleghany and Ashe counties. But his team does well to find one or two animals a day. Hellbenders are apparently not doing well in the New.

While working on this article, photographer Todd Pusser and I visited one of the state's best remaining populations. Within a few hours, and without turning any rocks, we had counted at least 24—more than I'd ever seen before. On at least two occasions I could stand in one spot and see five. Spawning was in full swing, and many small strings of eggs were awash in the current—perhaps mislaid by females or dislodged from beneath nest rocks by the scuffling of competing males.

But despite the density of adults, larvae and juveniles are rarely encountered in this population. Humphries, who has studied this same population for a decade, believes the adults may all be quite old and that breeding recruitment may be very low. Though the water quality there is relatively high, he believes recreational use is impacting the river. I wondered if any of the other people in the river ever even noticed the hellbenders. Surely the canny, focused fly-fishermen must see them often. Did they experience the same exhilaration I did when they saw one creeping along the bottom? As I watched a big, blotched male nudge a smaller, salmon-pink one away from his rock, while a third bite-scarred veteran rested quietly a few feet away, I wondered how many places were left where such could still be witnessed and if I would ever get to see it again. That may depend partly on the handful of people who care about snot otters, and who are working to save a future for them. But mostly it will depend on our species as a whole—whether we can adopt values focused on respect for all life and long-term sustainability of all resources.

As for me, I don't find time to work with hellbenders much, nor do I feel compelled to seek them out often. Just knowing they're there usually suffices. But some things stick in your mind. And every so often, a condition best described as snot otter withdrawal might find me gravitating toward some montane river, more hopeful than hell bent, anticipating reconnecting with one of the true ancient wonders of Appalachia, and grateful to live in a world where such can still be found. ◆

Jeff Beane is a herpetologist and regular contributor to Wildlife in North Carolina.

FIND OUT MORE

For additional information about hellbenders, visit: hellbenders.org. If you see a hellbender in North Carolina, report it to the

N.C. Wildlife Resources Commission (lori.williams@ncwildlife.org)

North Carolina State Museum of Natural Sciences (jeff.beane@ncdenr.gov) or the

Carolina Herp Atlas (carolinaherpatlas.org)

If you catch a hellbender on a hook, use a glove and pliers to carefully unhook and release it. If you are unable to remove the hook, or otherwise encounter one that might be injured, try contacting a Wildlife Resources Commission biologist for assistance. Report illegal killing or harassment of hellbenders to your local wildlife enforcement officer or call 1-800-662-7137.

DE POTTER/N.C. ZOOLOGICAL PARK

WHITE LIGHTNING

WRITTEN BY JAY BARNES

Each summer we're all tempted to spend long hours outdoors, but we should all respect the common thunderstorm—and the deadly force it delivers from above.

A baking sun, rich salt air and good fishing are all part of the lure of the North Carolina coast in summer. For Mitchell and Toni Carter of Clinton, family trips to their camper on Topsail Beach were a regular escape. The Carters, with their kids Lucian and Sarah Ellis, loved the area's natural beauty and enjoyed fishing the shallow waters of Topsail Sound. They often fished along the empty shores of Lea Island, just south of Topsail Inlet. And it was there, at about noon on July 7, 2008, that a routine family outing turned tragic.

Late that morning a summer shower developed over the sound, chasing the family onto the beach in search of shelter. They huddled underneath an old fishing shack on the island's north end—the only structure on this otherwise desolate barrier beach. As a hard rain fell, they ate a packed lunch and waited for the storm to pass. But then a bolt of lightning hit the structure, shocking all four family members and killing 16-year-old Lucian.

Stunned by the strike, Mitchell Carter soon began cardiopulmonary resuscitation (CPR) on his stepson and wife Toni, who was knocked unconscious. Twelve-year-old Sarah used a cell phone to call 911. Pender County EMS arrived by boat, and the family was transferred to New Hanover Regional Medical Center in Wilmington. Though the Carters and daughter Sarah recovered from the strike, they lost Lucian—a bright young man who loved spending time hunting and fishing with his family.

Lucian's story is not unlike that of many lightning victims caught by storms in the great outdoors. Lightning is among the deadliest forces of nature, on average killing more Americans each year than hurricanes, tornadoes, earthquakes or winter snowstorms. In years past, most victims were farmers, sailors, or laborers who make their living outside. But fishermen, boaters, hunters, hikers, campers, joggers, golfers and other sports enthusiasts now account for a large percentage of lightning deaths in the U.S. Each year, scores are killed and hundreds more injured by seemingly random bolts from the skies above.

Anglers fishing from open boats or empty beaches are often among the grim statistics. Recent casualties include two brothers killed in their boat near Choctow Beach, Fla., in 2008; a Louisiana man struck while pulling anchor on a bayou near Lake Charles in 2009; and two more in 2010—a commercial fisherman killed while checking crab pots in Texas and a Connecticut man struck along with three others while fishing from a rock jetty.

For every person killed by lightning, there are nine others injured by strikes. Missouri resident Gabe Neal and his 17-year-old son Christian were among the lucky ones. They were casting about on Harrisonville Lake in June 2009 when a thunderstorm moved in and chased them back toward the local boat ramp. Since the lake was restricted to trolling-motors only, the two were putting along when Neal saw a bright flash over the lake and knew that thunder would quickly follow.

"I counted to four, and the thunder came. I said 'Wow! That was close,'" recalls Neal. "The next thing I knew, I thought our boat blew up."

A bolt of lightning struck Christian directly, channeling through the custom graphite fishing rod he was holding. He was knocked back several feet in the boat and suffered burns to his face, arm and hands. His dad was blown overboard. Luckily, both men survived, thanks to fast action from a nearby disabled veteran who came to their aid and an EMS team that quickly arrived on scene.

"It felt like I was hit with a sledgehammer," remembers Neal. "I know we're lucky we survived. We both still have constant ringing in our ears, but now we're back to fishing and hunting and carrying on like we used to."

The strike destroyed the boat's gauges and every electrical component on board—causing about $8,500 in damages. But the most dramatic damage was to the graphite rod in Christian's hand, one his dad had designed and built himself. After the strike, it looked like a strange gray mass of melted cotton candy.

WHAT IS LIGHTNING?

Once thought to be tossed down from the heavens by Zeus himself, lightning is best defined as the instantaneous release of a static charge on a grand scale. Crude "friction machines" and static-charge-storing Leyden jars were popularized in parlor tricks for the royal courts of Europe in the early 1700s. In 1746, a Scottish doctor traveled to Philadelphia and performed this "electric magic" after a dinner party. In attendance was the local postmaster—Benjamin Franklin—who took a keen interest in the phenomenon. Over the next several years, Franklin's research—including his famous kite-and-key lightning experiments—proved lightning was indeed electrical and helped define our basic understanding of electricity.

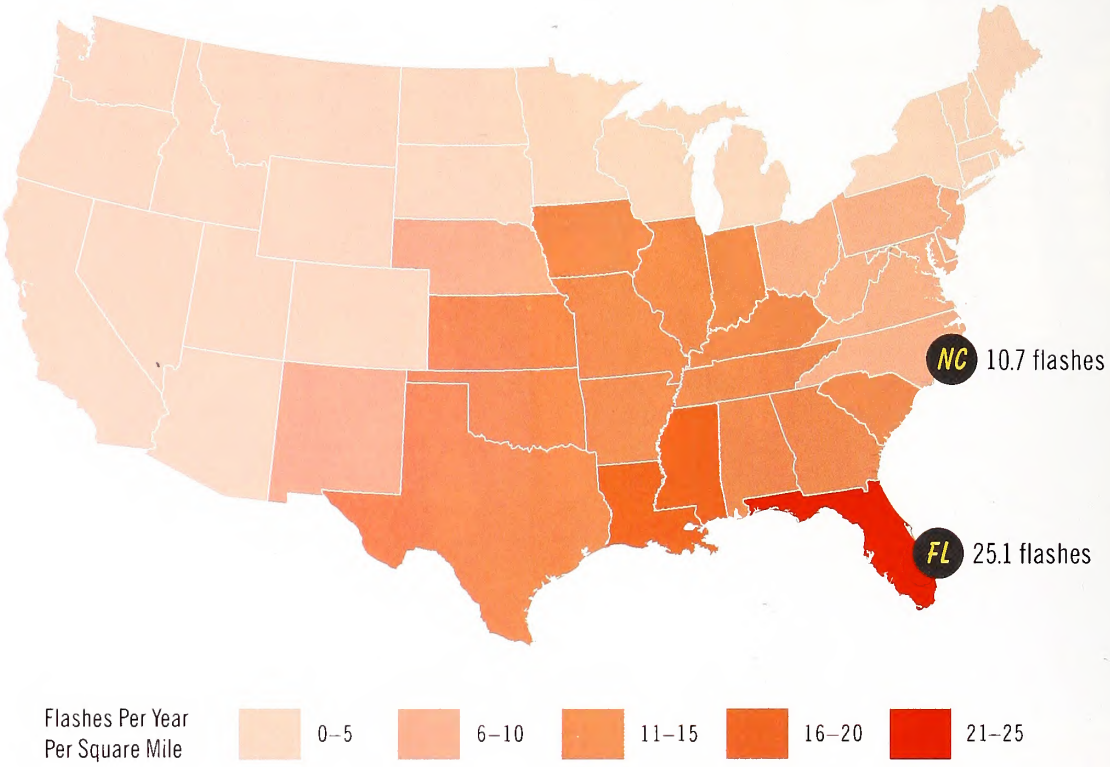
Though it can strike any time of the year, lightning most often occurs in summer when billowing clouds reach high in the atmosphere, creating thunderstorms. The taller the clouds, the more electrically-charged ice crystals form, and the greater the lightning display. From the charged ice particles, invisible stepped leaders of ionized air zigzag to the ground in less than the blink of an eye. The negatively-charged leader is then attracted to a channel of positive charge reaching up from the Earth, usually through a tall object like a tree, tower or building. Once the two connect, a powerful electric current flows back to the cloud at 60,000 miles per second, creating the flash we know as lightning.

The physics of the strike are impressive. A bolt of lightning usually measures one to two inches in diameter, but can travel more than 60 miles. It can produce over 1 billion volts, instantly heating the air to 60,000 degrees Fahrenheit. The rapid heating of air produces a loud clap of thunder, but since sound travels more slowly than light, the thunder is heard moments later. Lightning flashes about 45 times every second somewhere on Earth. Each year in the continental U.S., 25 million cloud-to-ground flashes are recorded, though about half of these strike more than one ground point.

Florida is the lightning capital of the U.S., with over 25 cloud-to-ground flashes per square mile each year. North Carolina averages 11 flashes per square mile, enough to make the Tar Heel state among the nation's most dangerous places for lightning strikes.

YEARLY AVERAGE CLOUD-TO-GROUND FLASHES PER SQUARE MILE

MAP BY ALYSSA STEPIEN
SOURCE: NOAA



DANGER FROM THE SKY

For those who get caught outside during a thunderstorm, the risks are very real. The chances of being struck by lightning may seem remote at first, and are sometimes lumped together with the one-in-millions odds of a shark attack or winning the lottery. But according to the National Weather Service, your chances of being struck over the course of your lifetime are about 1 in 6,000—and much higher than that if you live in a lightning-prone state and are male. Men account for more than 80 percent of lightning injuries and fatalities.

Since 1959, the U.S. has averaged 58 lightning deaths annually, with Florida leading other states in fatalities at 461. North Carolina ranks third in the nation, with 192 deaths over the last 50 years. Fortunately, the yearly averages are declining, thanks largely to better emergency response and use of CPR. But besides the fatalities, thousands more people have survived lightning strikes and are sometimes left with severe injuries and disabilities that can last a lifetime. Survivors may suffer neurological problems that can affect memory, hearing, motor skills and personality, and can cause muscular pain, fatigue, insomnia and a host of other symptoms.

Steve Marshburn was working in a bank in Swansboro back in 1969 when he was electrocuted after lightning struck the drive-through window. He survived, and, after suffering various ailments for more than 15 years, began contacting other lightning survivors and comparing notes. In 1989, he helped form the nonprofit Lightning Strike and Electrical Shock Survivors International, based in Jacksonville. He created the website www.lightning-strike.org, has published 13 books on the subject, and provides information and support for thousands of lightning victims around the globe.

JUSTIN BARNES/NCDPR

Florida has the nation's highest flash density, averaging more than 25 cloud-to-ground flashes per square mile per year. In comparison, North Carolina averages 11 flashes (left). A lightning strike in sand melts the grains together to form a tube called a fulgurite (above), which can reach more than 5 feet in length.

Lightning can affect a victim in five different ways. A *direct hit* is generally considered the most dangerous, and occurs when a person is struck directly—usually when standing or walking in an open area. The risk becomes even greater if the person is carrying a conductor such as an umbrella, golf club or shotgun.

More frequently, victims are affected by *splash*, when lightning strikes a tree or building and "splashes" onto them as they seek shelter. In rural areas, splash sometimes kills livestock as they stand near a fence or huddle under a tree.

Contact injury results when a person is touching an object that is electrified by the strike, like a car door, a fencepost or even plumbing inside a house.

Large groups are sometimes shocked by *ground current* generated by a nearby lightning strike. The strike's voltage dissipates through the ground, but can still be powerful enough to injure

Common Types of Lightning

INTRA-CLOUD LIGHTNING Intra-cloud lightning occurs between oppositely charged sections of the same cloud. Though it is the most common form of lightning, the flash itself is obscured by the cloud and most often seen as no more than a flicker of light.

INTER-CLOUD LIGHTNING Inter-cloud lightning is similar to intra-cloud lightning, but the strike happens between oppositely charged sections of two separate clouds.

CLOUD-TO-GROUND LIGHTNING More is known about cloud-to-ground lightning than any other type. In most cases, cloud-to-ground lightning strikes originate in the lower, negatively charged portion of a cloud and connect with a positive charge on the ground. About five percent of strikes form in a positively charged section of cloud in the top of the storm. Though not very common, positive lightning is considered to be more dangerous. Positive strikes are generally stronger than negative ones and can hit the ground more than 10 miles from the thunderstorm. At such a distance, a person may not hear any thunder or feel the need to seek shelter.

Less Common Lightning

BALL LIGHTNING Ball lightning appears, as its name suggests, as a glowing ball that floats through the air. It typically lasts only a few seconds and its structure is not well understood.

BLUE JETS Blue jets appear as cones above the core of the storm. They are released at speeds up to 100 kilometers per second.

RED SPRITES Sprites occur simultaneously with cloud-to-ground or intra-cloud strikes as red flashes above a thunderstorm. They are usually seen in groups of two or more and last fractions of a second. The best place to spot a sprite is in complete darkness, with a clear view of a storm that is 100–200 miles away. Because of this, sprites are rarely sighted.

–Beth Carton

SOURCES: NASA, NOAA

victims standing close by. In 2009, 27 people were injured and one killed when lightning struck a barn where a crowd had gathered for a Fourth of July church event in Lakeland, Fla. Similar accounts of mass injury have been reported at soccer games and other outdoor gatherings.

Lastly, people are sometimes hurt when they are simply thrown by the *blast effect*. Though not electrocuted, these victims are injured by the explosive force of the shock wave generated when lightning strikes nearby.

OUTDOORSMEN BEWARE

Boating and fishing are just some of the outdoor activities that require a duck-for-cover when a thunderstorm approaches. Golfers are frequent lightning victims, as are joggers, hikers and ballplayers. Most organized sporting activities today (like kids' soccer leagues) have lightning policies that require postponement of play once a storm rolls in. Individual activities like hiking a mountain trail or going for a run on the beach require special attention to weather conditions and a change of plans at the first sound of thunder. Recent lightning fatalities have occurred in North Carolina from these same activities. Other victims have included motorcycle riders, surfers, people on personal watercraft and even two separate fatal strikes to people floating down rivers on inner tubes.

Campers are particularly vulnerable to lightning, especially those who take refuge in tents set up in open fields or under tall trees. Much of the danger results from the false sense of security provided by the tent itself and the fact that tent campers often spend long periods outdoors.

A 2003 study by the Royal Aeronautical Society reviewed 29 cases in the U.S. of lightning striking campers and their tents over a 25-year period. The study documented 11 fatalities and 125 injuries, about half of which occurred when lightning first hit nearby trees. Tents are not safe refuge in a lightning storm, and neither are golf carts, picnic shelters, open boats or soft-top convertibles and Jeeps. (See "Lightning Safety" sidebar, page 29.)

Christian and his father Gabe Neal were lucky to survive after being struck by lightning during a fishing trip. This is what remains of the fishing rod Christian was holding when the bolt struck him. He suffered burns to his face, arm and hands, and his father was blown overboard.

COURTESY OF GABE NEAL

WHAT ABOUT MY BOAT?

By the time the Napoleonic Wars ended in 1815, more than 220 British tall ships had been damaged or burned—not by the French, but by lightning. Benjamin Franklin's investigations 50 years earlier had brought a new understanding of lightning, and even a means to contain its impact—he invented the lightning rod in 1752. But because Franklin had been a "rebel colonist" and a close friend of French royalty, the British navy refused to employ his techniques until the late 1830s, and thus suffered many additional losses.

Lightning rods work by providing a path of least resistance for a strike. They channel current through a metal rod at the top of a structure down a wire into the ground. A similar arrangement works on a boat or ship, though grounding occurs into a lake or ocean. Most small boats typically aren't engineered with any specific lightning protection, though boats with cabins offer some protection for passengers onboard. An open boat out on the water is not a safe place to be in a thunderstorm.

Larger boats and yachts are usually *bonded*, designed with all underwater metal fittings, including the prop, linked together electrically with major metal components like the boat's engine and transmission. This protects people aboard the vessel, sometimes at the expense of engines and electrical control systems that can be burned or disabled by a lightning strike. Additional cabling that properly grounds antennae, masts and outriggers can reduce this risk, because lightning generally enters through the highest point. The most effective designs feature through-hull metal plates that become "reverse lightning rods," dissipating voltage just below the water's surface.

BoatUS insurance claim statistics show that each year in the U.S., five of every 1,000 sailboats and about two of every 1,000 powerboats are struck by lightning. Interestingly, catamarans are struck far more often than single-hull sailboats.

Jay Barnes is the former director of the N.C. Aquarium at Pine Knoll Shores and the author of "North Carolina's Hurricane History."

NATURE'S WAYS

What Happens When Lightning Hits A Tree?

See Nature's Ways, page 43.

Lightning Safety, Facts & Myths

Be Safe.
Lightning danger begins when you first hear thunder. Move indoors as quickly as possible or stay inside a closed automobile. No place outdoors is safe, but you should especially avoid bodies of water and open areas—you don't want to be the tallest thing around. If you're with a group of people and no shelter is available, spread out. Keep low but do not lie flat on the ground. Stay away from trees, metal fencing, picnic shelters, tents, golf carts and convertible automobiles.

Estimate Distance.
As a storm approaches, you can estimate your distance to the latest strike by counting the seconds between the flash and the resulting clap of thunder. Sound travels one mile every five seconds, while the flash arrives much faster—at the speed of light. Count the seconds and divide by five to determine your distance (in miles) to the strike.

First Aid.
Lightning strike victims frequently experience cardiac arrest. Rapid response with CPR saves lives. If a group of people are affected, always treat those who appear motionless first. Lightning victims are not dangerous to touch.

Fulgurites.
When lightning strikes a sandy dune or beach, it leaves behind fulgurites, hollow glass tubes below the surface of the beach formed of melted quartz and feldspar. Difficult to find and fragile when excavated, fulgurites typically measure just a few inches but can reach several feet in length. Varieties from around the world are collected and traded by enthusiasts.

Myth: Lightning always comes from dark, rainy skies.
"Blue-sky" strikes have been documented 10 or more miles away from a storm, so don't assume you're safe because the sun is still shining.

Myth: If you're struck, you're dead.
Only about one in 10 lightning strike victims is killed.

Myth: Lightning never strikes the same place twice.
Any tall, isolated object is at risk of attracting a strike, and many towers, buildings and church spires are struck repeatedly. The Empire State Building is hit about 25 times each year.

Myth: Metals attract lightning.
Elevation and isolation are the factors that determine the location of a strike. Tall objects are often metal, like cell towers and water tanks. But because metals are better electrical conductors than other materials, lightning current frequently follows wires or other metal objects.

Through study and experience, Stephen Foss has accumulated his own collection of tips and tricks for fishing on Lake Norman.

A young angler's guide to catfish, bass and carp

Geared Up

Written by Stephen Foss & Photographed by Melissa McGaw

Editor's Note: Just as young hunters and fishermen need encouragement, so do young writers. To further that end, Wildlife in North Carolina *will run three stories from youthful authors in consecutive issues.*

The first author, Stephen Foss, is a high school student in Mooresville and spends a great deal of time fishing Lake Norman. "He really wants a career as a fisherman, but I keep telling him no one is going to pay him to fish in the lake all day," said his mother, Kristen.

Stephen wrote this story upon the suggestion of a former teacher, Susan Humbert, who wanted to help him improve his writing skills. Stephen loves fishing, loves to read about fish and study fish. His enthusiasm is unmistakable and inspiring. Stephen also has been diagnosed with Asperger's syndrome.

Enjoy Stephen's story. You'll most likely learn something. I did.

–Jim Wilson

CATFISH As the fish was tugging and bending my Ugly Stik (which is my most favorite rod in the world) at an alarming angle, he kept peeling line off my reel against the drag system. After a 10-minute fight, I successfully landed a 2 1/2-foot blue catfish on 12-pound line. The fish managed to stab me in the hand with its right-side fin while I was trying to weigh it. After I finally managed to get it weighed without the slimed-up fish slipping off the scales, it weighed in at 9 pounds, 8 ounces!

When it comes to fishing for catfish, I personally like to free-line, which is done only with the line, swivel and a snelled circle hook. But other anglers prefer different rigs when catfishing. Two other common rigs include the three-way rig and the slip-sinker rig. All three are extremely effective.

When fishing for catfish here are a few interesting tips for hooking a big one. Always, always, ALWAYS use stinky bait or bait that has a scent. If you are not sure which baits to use, here are some that are good baits and one that is a strange, yet effective bait.

First are the smelly ones. Getting catfish bait is pretty simple. If you enjoy catching little fish as bait, I would suggest putting them in single rows on a paper towel and leaving them out in the sun for a day or two. However, if you don't want to wait that long, just head to a sporting goods store and you should be able to get catfish bait dough or vacuum-packed fish or crayfish. As for the very strange bait, it is, believe it or not, SOAP! My little brother Michael tried soap once and caught a nice channel catfish, but I don't guarantee that it will work every time. I prefer to use the catfish dough, but you should try all different kinds of baits before you settle on which one you like the best. Blue catfish prefer cut bait over whole bait.

The earlier you wake up the more likely you are to catch a catfish or bass, but I am not saying you won't catch a catfish anytime during the day. I have caught decent-sized catfish in the middle of the afternoon. Actually catfish roam the waters all times of the day, but are much more active at night. If you don't want to get up early then you should try fishing at dusk when the catfish start to become active and are hungry. If you want to fish during the night, then what I would do is bring a blanket or two, coffee, tea or soda, a couple of books, and some snacks like candy, fruit, energy bars, sandwiches or any packaged snack.

"A good spinner bait has the perfect combination of blade, weight, color and composition in order to give you your most successful catches."

The terminal tackle that you should try is 12-pound line, hook sizes 4 to 1/0, a swivel, a 1/2-ounce bank sinker if you are using a three-way rig, and a 1/2-ounce egg sinker if you are using the slip-sinker rig. If you are using a free-line rig then just use a swivel and a snelled circle hook or a snelled J-hook. DO NOT STRIKE WITH A CIRCLE HOOK. If you do that, then you pull the hook out of the fish's mouth. Just let the fish run against your drag for a few seconds. Circle hooks guarantee that the hook will go no deeper than the corner of the mouth and have a no-slip grip.

The best places to fish for catfish are where there is shelter and places for the fish to hide, just like bass. Catfish love to lurk under docks and at the edges of vegetation where there are smaller fish. In my experiences, I personally like to bait my hook and drop it in the water like fishing for bluegills, except the bait is on the bottom. That way it is easier and faster to bring the fish up and unhook it.

Other anglers prefer to cast it out and like to fight the fish and tire it out because it doesn't flop around on the dock or squirm and stab you with its fins when you unhook it and hold it for a picture. I like to hold the catfish just behind the skull; that way the fins can't reach me and I have a firm grip that is comfortable to the fish.

CARP As my rod bent into almost a complete U-shape, the carp tried to head for sanctuary. With a hard tug I managed to steer it away from the snags of rocks and tree stumps. I had another problem, though: The fish was so strong that I had to tighten my drag so only a hard, fast tug could get line off the reel, and yet still the fish managed to get line off the reel. After fighting for about 25 minutes, the fish began to tire, so I grasped the opportunity and brought it over to my waiting net. When I lifted the fish out of the water, its weight was too much for the net and the metal shaft bent. It weighed an outstanding 27 pounds, 3 ounces.

Carp are extremely wary fish that bolt away when something unusual comes along. Carp like to inhabit slow-moving and still waters. Dress in dark clothes so it will be harder for the fish to see you. When it comes to carp fishing, I use a rig called the bolt rig. This rig consists of a hook that has been hair-rigged on an 18-inch, 12- to 15-pound line attached to a swivel with a small sinker along with a backstop or stop knot. Now you might be thinking, Why not use a free-line rig? Although it might appear to be the logical answer, the bolt rig works even better. When the carp picks up the bait, it feels nothing because of the short line, but when it swims away, the weight pulls hard on the backstop or stop knot, which startles the carp, causing it to bolt and hook itself.

There are enormous selections of baits, including bread, maggots, worms, luncheon meats, sweet corn, potatoes and boilies. All these baits have to be on a hair rig. If you don't use the hair rig, the carp will feel the hook and reject the bait and bolt away and you will have to wait a few hours for that fish to return. But carp fishing is so fun, you just never know when your rod is going to bend and spring out of control as you feel the strain of the fish fighting against you.

Having landed this awesome fish, which is capable of leaping out of water after bugs, I consider taking a carp out of a pond or lake a real honor. A good place to start looking for carp is to find places with vegetation or underwater structures.

BASS The bass just would not give up. Every few seconds it leaped clear of the water to try to free itself from my Jitterbug. Finally after almost seven minutes, I was able to land that 9-pound largemouth and bring it onto the dock. It was a good 1 1/2 feet long.

I go fishing at the appropriate time. Fishing is especially good early in the morning or in the evening. The three days on either side of a full or new moon are considered good for big fish. You should get a map of the lake and look for submerged islands and long points. A point is a finger of land that stretches out under the water. Bass love to use points to travel back and forth from deep water to shallow water.

Bass also use creek channels to travel from spot to spot. Channels will also be shown on lake maps. Large flat areas of the lake can be very good early in the day. Use a crankbait, top-water lure, spinner bait or jerkbait over these flats. Take the time to examine the lake and look for fallen trees, brush, rocks and other objects. Pros call it cover. Bass will hide and wait for fish or other prey to swim by. When fishing heavy cover, where the bigger fish normally live, use a plastic worm or a "jig and pig."

Top-water lures are the most exciting to fish. These lures float on the surface. When fishing with a top-water, cast near the cover, let it sit for several seconds, then twitch the rod tip so the lure works on the surface. When done correctly you will experience a KA-SPLOOSH as the surface explodes as the fish bites your lure!

When fishing is tough or slow, try using a smaller lure. A 4-inch worm is a good choice.

Foss knows that the right strategy and a little patience will help him catch the fish he wants. His grandfather, Jim Sabine, often pilots the boat while Stephen fishes.

Rig the worm on a 1/0 hook with a BB-size split-shot attached to the line about 18 inches above the hook. Cast the lure out and wait for it to settle on the bottom. Work or reel it very slow. The weight will bounce on the bottom, causing the worm to dart in different directions.

Most fish will bite a lure that looks like a minnow, crayfish or other living prey. Spinner baits, crankbaits and plastic worms work best for bass. Trout, pike and saltwater fish will hit shiny metal lures.

Spinner baits are commonly used because they cover a great deal of water at once. Not only that, but they cover a variety of depth levels in the area in a very short time period. This large amount of coverage means that you're getting the best bargain for your lure money. Now, choosing the perfect kind of spinner bait may be a little more difficult. A good spinner bait has the perfect combination of blade, weight, color and composition in order to give you your most successful catches. Experiment with the different types that are available and read up on what your favorite fishermen use—you'll eventually find one that works best for you.

Top-water baits are most commonly used during the early morning or late evening hours when the conditions are dusky and there is low light available. Top-water lures are also most effective when there's a little wind and an active chop (ripples) on the water so that it doesn't frighten off the bass when it cuts through the water. If there's no other activity, the bait moving through still water can sometimes be problematic. Experienced fishermen often use this type of bait because of the sheer beauty involved in seeing a bass caught near the surface of the water. It's a completely spectacular experience that most fishermen swear by.

Lipless crankbaits are generally considered one of the best ways to locate a bass that's hiding out in tall grass. By placing these baits on the top of the grass and rippling them through the water you can almost guarantee that if there's a bass in the area, he's going to strike. Often times, professionals swear that when they've tried almost everything else to lure the bass out of its hiding spot,

the lipless crankbait works even when most of the more sophisticated tools didn't. If you're just getting started, ask a friend or bait shop employee for advice on using this type of bait.

Since these basic baits are the favorite of so many fishermen, many newcomers may be tempted to try out something new and different to see if it gives them an extra little push to the top of the sport. However, one of the more important things to remember is that there's a reason these baits are still around and used so often—it's because they work. This alone speaks volumes about their durability and their power to catch bass in almost any condition.

WILDLIFE IN NORTH CAROLINA 2012 PHOTO COMPETITION

***WILDLIFE IN NORTH CAROLINA* MAGAZINE IS PROUD TO ANNOUNCE THE EIGHTH ANNUAL INSTALLMENT OF OUR POPULAR AND SUCCESSFUL PHOTO COMPETITION.** Last year, approximately 1,000 photographers entered more nearly 4,000 images. This year, your winning photo could be published on the cover of this magazine.

This year also brings a change to the contest, in that photographers who are not already subscribers to *Wildlife in North Carolina* will pay a fee to enter. The entry fee is a one-year subscription to *Wildlife in North Carolina*. Subscribers and those photographers in the two youth categories (13–17 years old and 12 and under) may enter free of charge.

The cost of the prizes and the prints sent to winners has necessitated that the magazine join the ranks of many other photo contests and charge an entry fee.

The *Wildlife in North Carolina* Photo Competition aims to encourage people to participate in nature photography, thereby fostering greater understanding and appreciation of North Carolina's wildlife and wild places. Winning photographs will be published in the January–February 2013 issue of *Wildlife in North Carolina*. Thanks to our exhibition sponsor, JW Photo Labs of Raleigh, the winners will also be exhibited at the Museum of Natural Sciences and at other science museums and wildlife education centers across the state in 2013.

The N.C. Museum of Natural Sciences, our founding partner, is a fantastic place to learn about North Carolina's wildlife and wild places through its exhibits and classes. Another photo competition partner, the N.C. Division of Parks and Recreation, manages North Carolina's outstanding state parks. These are ideal places to photograph wild animals and wild landscapes. Thanks to partner UNC-TV, you don't have to leave home to become educated about our state's wonderful natural resources—just turn on North Carolina Public Television's programming.

Visit ncwildlife.org, the museum, any of North Carolina's 41 state parks, or any of the seven statewide locations of our corporate sponsor, Great Outdoor Provision Co., for more information about the competition. Then get outside and show us your best nature photography.

JOAN STOCK

A lonely mountain view high above the clouds can provide just the right scenery for a photographer.

2012 COMPETITION RULES

WHO MAY ENTER

Amateur and professional photographers, except for employees of the N.C. Wildlife Resources Commission, the N.C. Museum of Natural Sciences, the N.C. Division of Parks & Recreation, UNC-TV and Great Outdoor Provision Co., and their immediate families (children, siblings and spouses).

WHAT TO ENTER

Photos will be judged in 10 categories:

Birds

Mammals

Reptiles and Amphibians

Invertebrates

Wild Landscapes: The peaks, valleys, plains and beaches of North Carolina.

Wild Plants and Fungi: Wild-growing plants only, including their flowers, leaves, fruits and other parts. Absolutely no cultivated plants will be accepted.

Outdoor Recreation: Show how people interact with North Carolina's natural world through activities that are inextricably linked to nature, such as hunting, fishing, hiking, rock climbing or canoeing.

Animal Behavior: Anything animals do, from everyday activities to interactions with other animals to unusual behavior.

Youth Photographer, 13–17: Any of the above subjects, shot by photographers under 18.

Youth Photographer, 12 and under: Any of the above subjects, shot by children 12 and younger.

Photographs must have been taken in North Carolina no earlier than Sept. 15, 2006.

You must declare on your entry form if your photograph is of an animal in captivity, such as at a zoo, nature center or rehabilitation facility. Please do not enter photos of animals that are both captive and non-native to North Carolina (for example, polar bears or lions at the N.C. Zoo).

No pets or domestic animals will be accepted, with the exception of animals participating with people in outdoor recreation (for example, hunting dogs or riders on horseback).

Please do not harass wildlife in an attempt to photograph it.

Manipulation of images, either film or digital, should be limited to conventional darkroom techniques or basic sharpening and cropping. Images should contain only the subject matter as originally seen through the viewfinder. Multiple exposures, digitally stitched photos, high dynamic range images and photos containing any manipulated or added content will not be accepted and should not be entered.

Entries may not contain any text aside from that contained in the subject matter. Date stamps, signatures and trail camera information are not permitted, regardless of whether they are added during or after the image is photographed. Original images may be cropped to eliminate date stamps or other text.

An entrant must hold all rights to a photograph. Photos previously published or pending publication, or that violate or infringe upon another person's copyright, are not eligible. Please do not infringe on the rights of property owners in an attempt to photograph animals.

HOW TO ENTER

Visit ncwildlife.org, click on the Photo Competition link, and then click the Enter a Photo link to submit a photograph. Only JPG files smaller than 2 MB will be accepted for upload. Upload your photo using the online entry form on the website. Repeat this process for each photo entered. Entrants may submit a maximum of two (2) photos per category.

The competition begins at 8 a.m. on Friday, June 1, 2012. Entries must be uploaded by 5 p.m. on Saturday, Sept. 1, 2012. Entrants may verify receipt of entries by checking ncwildlife.org and clicking the Photo Competition link to view a text list of all entries.

An image may be entered in only one category. For instance, if a photo of a preening wood duck might fit in Birds or Animal Behavior, you must choose the one category in which you want the image to compete.

Entrants in the youth categories must be the appropriate age for the category entered on the closing date of the competition. Once a youth photographer has entered two photos in the proper youth category, they may enter other photos in any other categories they wish.

PRIZES

All winners will be published in the January–February 2013 issue of *Wildlife in North Carolina* magazine and exhibited at the N.C. Museum of Natural Sciences in Raleigh. Winners will also receive a print of their winning entry from JW Photo Labs of Raleigh and products from sponsor Great Outdoor Provision Co.

Grand prize: Your photo published on the cover of the January–February 2013 issue of *Wildlife in North Carolina* magazine, plus $200.

First place, all categories: $100.

Second place, all categories: $75.

Third place, all categories: $50.

Special state parks prize: One photo taken in North Carolina state parks, regardless of category, will be selected as Best of State Parks. The winner will receive camping passes at their choice of North Carolina state parks and other noncash prizes to be determined. Finalists in consideration for this honor will be exhibited at various parks across the state.

JUDGES

Winners will be selected by a panel comprised of staff of the N.C. Wildlife Resources Commission, the N.C. Museum of Natural Sciences, the N.C. Division of Parks and Recreation and professional wildlife photographers.

THE FINE PRINT

By entering the *Wildlife in North Carolina* 2012 Photo Competition, entrants grant all sponsors the right to publish and use submitted photographs in print or electronic form to promote the competition. Reproduction of entries will include the necessary photographer credit.

Entrants agree that if their submission is selected as a winner, they grant all sponsors the right to display their photograph(s) at venues including but not limited to the N.C. Museum of Natural Sciences. Exhibition of entries will include photographer credit.

Entrants will be asked on the online entry form if their photo was taken in a North Carolina state park. All such entries will be provided to the N.C. Division of Parks and Recreation for possible usage in public information/promotional materials, park displays or agency press releases to various media outlets. Any such usage will include the necessary photographer credit.

Winners will be required to provide original source material — slides, high-resolution digital files or negatives — for reproduction in the magazine and for exhibition prints. Original digital files of winning photos must be accompanied by a color print of at least 4x6 inches.

Wildlife in North Carolina staff will determine entry eligibility.

QUESTIONS?

Please do not call about entries. Send questions to competition@ncwildlife.org.

Enter online at ncwildlife.org.

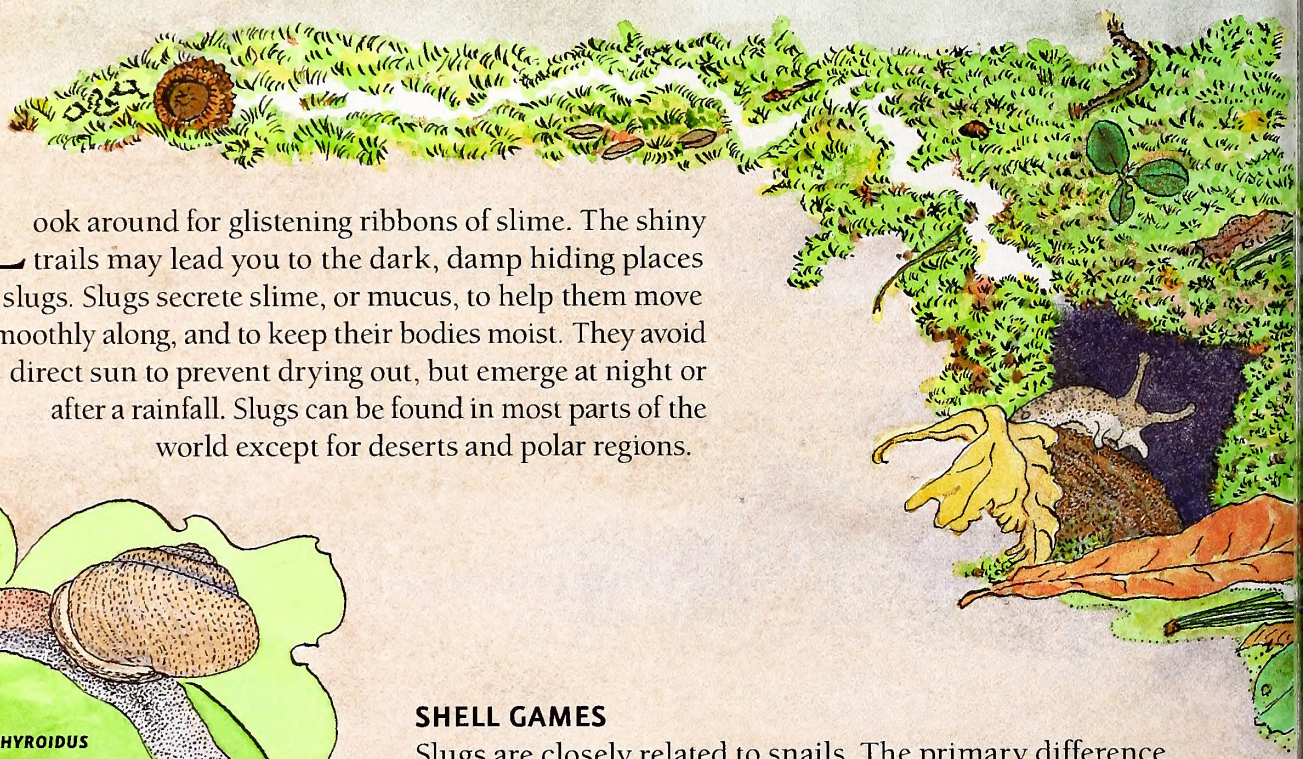
Oozing along on trails of slime, they're

Slippery, Stealthy Slugs

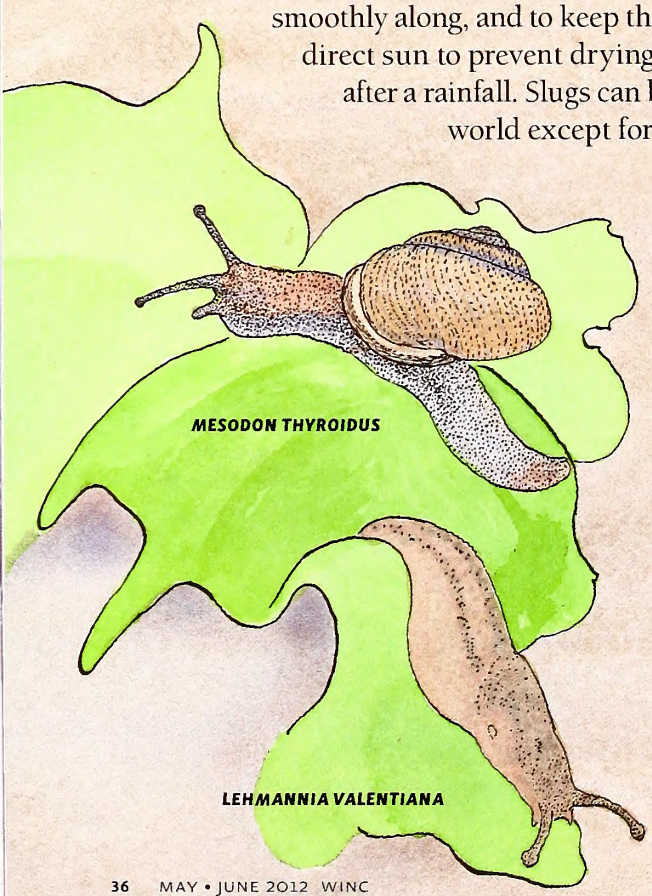
PHILOMYCIDA SP.

LEHMANNIA VALENTIANA (NON-NATIVE)

written by Susan Carl / illustrations and nature activity by Anne M. Runyon



Look around for glistening ribbons of slime. The shiny trails may lead you to the dark, damp hiding places of slugs. Slugs secrete slime, or mucus, to help them move smoothly along, and to keep their bodies moist. They avoid direct sun to prevent drying out, but emerge at night or after a rainfall. Slugs can be found in most parts of the world except for deserts and polar regions.

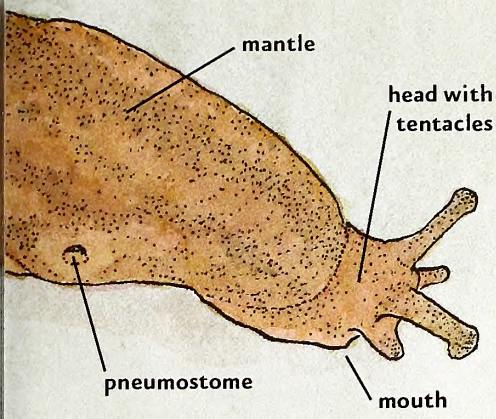


MESODON THYROIDUS

LEHMANNIA VALENTIANA

SHELL GAMES

Slugs are closely related to snails. The primary difference between snails and slugs is the amount of shell found on the animals. Snails produce coiled shells large enough to retract into, while slugs have only a tiny shell, or no visible shell at all. Both slugs and snails are in the class Gastropoda, which is Latin for stomach foot, since they appear to be crawling on their bellies. In fact, they move on one large muscular foot. The foot secretes mucus that makes it easier for a slug to glide forward and protects it from getting cut while crossing rough areas. Slugs are slow movers, but fibers in the mucus help them stick to plant stems and even the undersides of leaves.



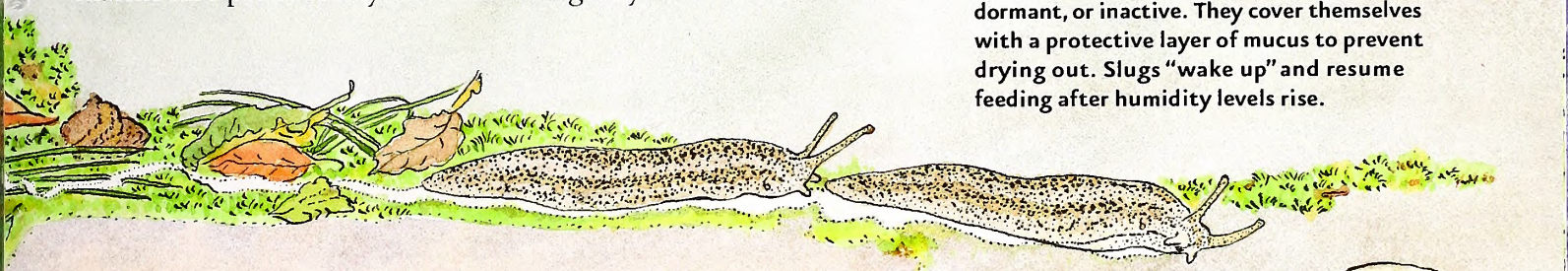
Soft, slow-moving slugs have few defenses against their many predators. When attacked, slugs may contract their bodies, making them harder and more compact. Their body mucus provides further protection by making them hard to pick up, and predators often find the flavor distasteful. Most slugs are also camouflaged to blend in well with their environment.

SIMPLE CREATURES

Slugs are easily identified by their soft, unsegmented bodies. They are invertebrates, meaning they have no backbone, and in fact they have no bones or exoskeleton at all. Their small heads support two sets of tentacles. The top pair is used for vision, while the lower is for tasting and smelling. If the slug you're eyeing is eyeing you back, you'll see the longer upper tentacles move around for a better look. Their vision is poor, however, and slugs rely mostly on their sense of smell to avoid predators and find food. When threatened, slugs invert their tentacles into their bodies.

The mouth of a slug is located below the lower set of tentacles, and contains an organ called the radula. Rather than chewing, slugs rasp off small particles of food with this hard, file-like organ. The radula contains many teeth that are constantly being worn away and replaced. Slugs breathe by taking in oxygen through a hole on their right side called a pneumostome. The pnuemostome is found in the tough leathery mantle covering most of the slug. Secretions from a slug's mantle also produce any shell that a slug may have.

In addition to hibernating in winter, slugs may estivate in the summer. When the weather is very hot and dry, slugs can go dormant, or inactive. They cover themselves with a protective layer of mucus to prevent drying out. Slugs "wake up" and resume feeding after humidity levels rise.



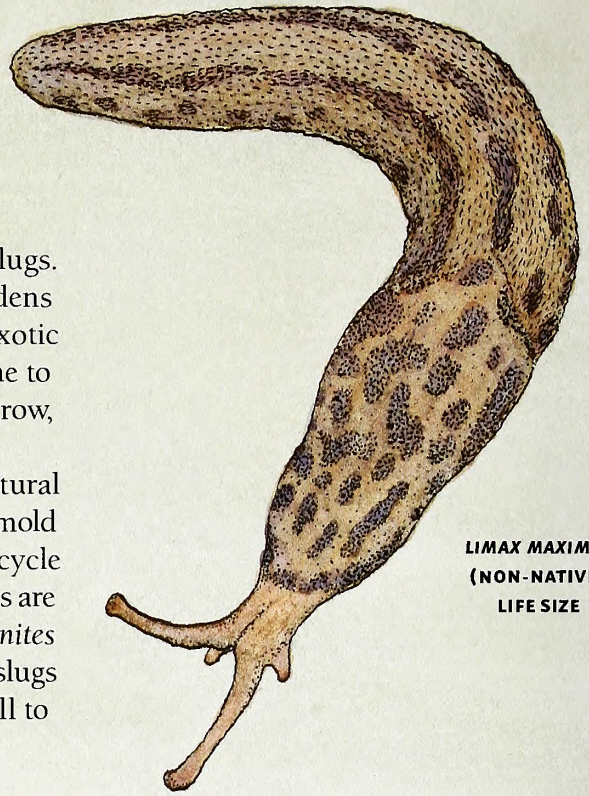
MAMAS AND PAPAS

Slugs are hermaphroditic; their bodies contain both male and female organs. When a slug is ready to mate, the scent of its mucus changes. Another slug will follow the slime trail, and upon meeting, the two fertilize one another. Both animals lay separate clusters of 20 or more gelatinous eggs. The young slugs that hatch a few weeks later look like miniature adults and fend for themselves without any parental assistance. Most of the young will be eaten by predators like birds, turtles and toads. Despite a high predation rate, slugs have survived since the time of dinosaurs partly by being able to reproduce quickly and in large numbers.

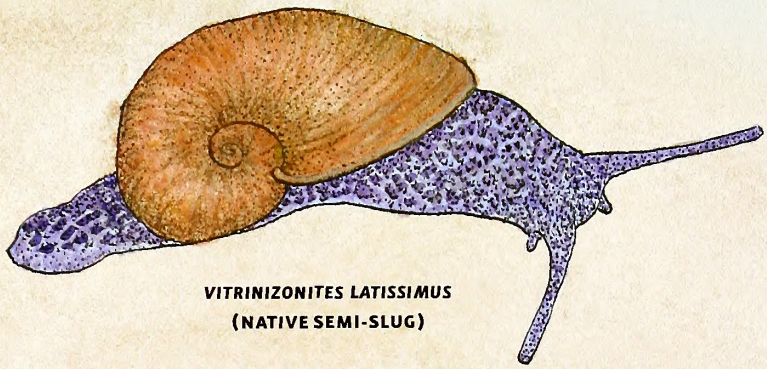
TERRESTRIAL SLUGS IN NORTH CAROLINA

North Carolina is home to both native and non-native slugs. The slugs most commonly seen around houses and gardens are imports from other countries. These non-native, or exotic species are also responsible for most of the damage done to food crops. Slugs can eat foliage faster than plants can grow, and leave behind holes in fruits and vegetables.

North Carolina's native slugs are typically found in natural wooded areas. Called mantleslugs, they eat mushrooms, mold and fungi. They are important decomposers, and help recycle nutrients back into the soil. The North Carolina mountains are also home to a semi-slug, the glassy grapeskin (*Vitrinizonites latissimus*). Semi-slugs seem to be a halfway step between slugs and snails, and have shells that are very soft or too small to retract into.



LIMAX MAXIMUS
(NON-NATIVE)
LIFE SIZE



VITRINIZONITES LATISSIMUS
(NATIVE SEMI-SLUG)

If you have a home garden, slug damage may be minimized in non-toxic ways. Place boards between plant rows, or leave halved citrus rinds in the garden. In the morning, collect slug invaders from the fruit, or under the boards. Add them to your compost pile where they can work for you as decomposers.

PALLIFERA HEMPHILLI
(NATIVE)
ACTUAL SIZE 25-30 mm

Get Outside

Slugs are easy to find and collect, and interesting to observe. Here are some tips on collecting them responsibly.

Search for slugs on cooler, moist days in the morning, or even at night with a flashlight. Do you see any slime trails to follow? Look under pots, rocks and branches. Remember that less friendly animals may also seek shelter here, so use caution.

Bring a high-sided container lined with moist soil or leaf litter, and punch holes in the lid. When you find a slug, try to lift it with plant material, or scoop the animal up gently with a spoon. Avoid handling them as much as possible.

Make note of where you found the slugs so you can release them back in the same location. North Carolina slugs hibernate in the winter, so they should be released before the weather turns cold.

At home, place the slugs and soil in a wide-mouthed glass jar, aquarium, or large plastic food container. Cover with plastic wrap and secure with rubber bands. Punch many holes in the plastic wrap for ventilation. Remember that slugs can easily scale the sides of a glass! Keep the container out of bright sun and mist it frequently. The soil should be moist, but not soggy. Give the slugs a place to hide by adding small stones, tree bark or leaves on top of the soil.

Feed your slugs by adding fruits or vegetables each day. Provide water by wetting the food first. Remove droppings and uneaten food daily.

Read and Find Out

- "The Secret World of Slugs and Snails" by David George Gordon, Sasquatch Books, 2010.
- "Under One Rock: Bugs, Slugs, and Other Ughs" by Anthony D. Fredericks, Dawn Publications, 2001.

Find out more about Project WILD Workshops and literature at the Wildlife Commission's website at ncwildlife.org.

The Wildlife Endowment Fund

An Investment for the Future

Established in 1981, the Wildlife Endowment Fund allows the Wildlife Resources Commission to accept tax-deductible contributions for wildlife conservation. Money from the sale of lifetime licenses is also placed in this fund. Your donation or purchase will ensure that North Carolina will have a rich wildlife heritage for generations to come.

Lifetime License Form

Infant and Youth *(check appropriate block)*:

☐ Sportsman Infant $200
(under 1 year old—Application must be received before applicant has attained 1 year of age.)

☐ Unified Sportsman/Coastal Recreational Fishing Infant $275
(under 1 year old—Application must be received before applicant has attained 1 year of age.)

☐ Sportsman Youth $350
(ages 1 through 11—Application must be received before applicant has attained 12 years of age.)

☐ Unified Sportsman/Coastal Recreational Fishing Youth $450
(ages 1 through 11—Application must be received before applicant has attained 12 years of age.)

A copy of the birth certificate must accompany applications for infant and youth licenses. Birth certificate documentation cannot be returned.

Note: Pending satisfactory completion of the hunter safety course, persons who possess infant or youth licenses may exercise the privileges thereof when accompanied by an adult who is properly licensed to hunt in North Carolina. "Accompanied" is defined as maintaining a proximity to the hunter which enables the adult to monitor the activities of, and communicate with, the hunter at all times.

Adult (age 12 or older) *(check appropriate block)*:

☐ Comprehensive Inland Fishing $250
(N.C. residents only—includes basic inland fishing, trout & trout waters on game lands)

☐ Comprehensive Hunting $250
(N.C. residents only—includes basic hunting, big game, game lands & N.C. waterfowl)

☐ Sportsman $500
(N.C. residents only age 12 or older—includes basic hunting & inland fishing, big game, game lands, trout & N.C. waterfowl)

☐ Coastal Recreational Fishing $250
(N.C. residents only—includes coastal recreational fishing)

☐ Unified Sportsman/Coastal Recreational Fishing $675
(N.C. residents only—includes same privileges as the Sportsman, plus coastal recreational fishing)

A federal waterfowl stamp must be purchased separately for all N.C. hunting licenses.

Note: On or after July 1, 1991, a person, regardless of age, may not procure a hunting license or hunt in North Carolina without producing a certificate of competency for completing the hunter safety course or a hunting license effective prior to July 1, 1991, or by signing the statement below that he or she had such a license.

Check appropriate block and attach required copy:

☐ Copy of Prior Year Hunting License

☐ Copy of Hunter Safety Certificate of Competence

☐ In lieu of copy, I am signing the statement below:

Statement: I certify that I was a licensed hunter prior to July 1, 1991.

Signature _____ Date _____

Visit us online at www.ncwildlife.org or call 1-888-248-6834 for a complete list of lifetime licenses, including those for nonresidents and 65 and older.

Lifetime License

Complete the following information if applying for a lifetime license. Be sure to check appropriate block(s) on reverse side *(please print legibly)*:

Name of Applicant _____

Daytime Phone _____

Mailing Address _____

Resident Address _____

County _____ Date of Birth _____ Driver License # _____

E-mail Address _____

Is this license a gift? ☐ Yes ☐ No If yes, mail license to ☐ Donor or ☐ Applicant.

License Donor's Name *(if applicable)* _____

Donor's Telephone # _____

Donor's Mailing Address _____

City _____ State _____ Zip _____

Method of Payment: ☐ Check ☐ VISA ☐ MasterCard

Acct. # _____ Expires _____

Print name exactly as it appears on credit card _____

Cardholder's Signature _____ Date _____

Personalize your Lifetime License for an additional $5:
Indicate your selection of letters, numbers, dashes, periods, commas and /or blanks up to 6 spaces: ___ ___ ___ ___ ___ ___

Indicate your personal message including letters, numbers, dashes, periods, commas and /or blanks up to 21 spaces:

___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___
___ ___ ___ ___ ___ ___ ___ ___ ___ ___

Signature of Applicant or Donor _____ Date _____

Note: Only adult lifetime licenses may be purchased by phone or online (VISA or MasterCard only). Call toll-free (1-888-248-6834) or visit us at www.ncwildlife.org. Use this form to purchase infant and youth lifetime licenses by mail.

Tax-Deductible Contribution

☐ I wish to make a tax-deductible contribution to the Wildlife Endowment Fund. Enclosed is my check for $ _____. *(Credit card payments cannot be accepted.)*

Name _____

Daytime Phone _____

Mailing Address _____

City _____ State _____ Zip _____

Make checks payable to: *Wildlife Endowment Fund*

Transactions are not considered final until the check has cleared the bank. Items purchased with a returned check will be made invalid. A service charge of up to $25 will be charged on any returned check. (N.C.G.S. 25-3-506)

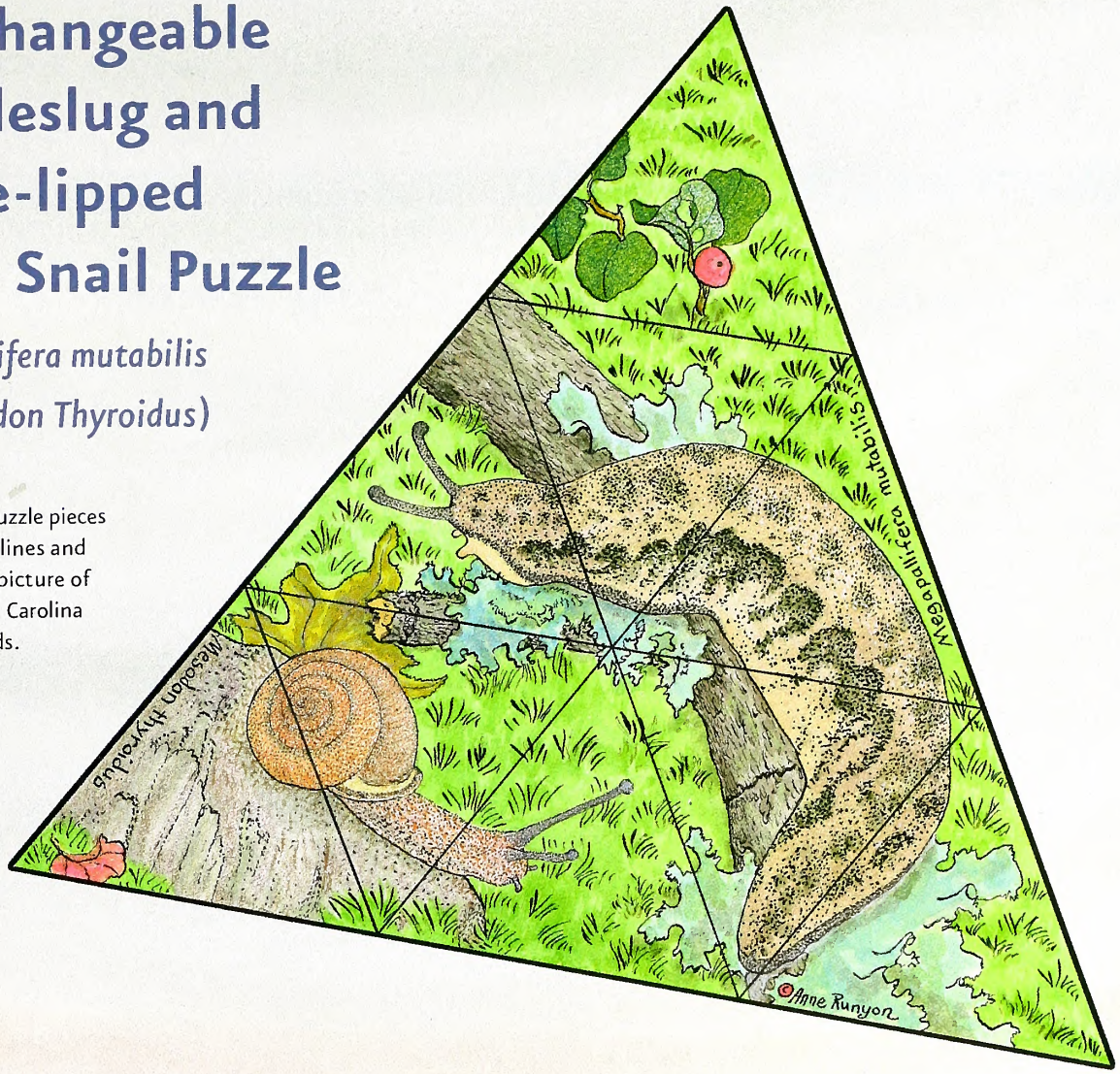
Mail completed application and payment to:
NCWRC, License Section, 1707 Mail Service Center, Raleigh, NC 27699-1707

Office location: *NCSU Centennial Campus, 1751 Varsity Drive, Raleigh, N.C. 27606*
Telephone: 1-888-248-6834 (2HUNTFISH)

The Changeable Mantleslug and White-lipped Globe Snail Puzzle

(*Megapallifera mutabilis* and *Mesodon Thyroidus*)

Cut out all the puzzle pieces along the black lines and reassemble the picture of these two North Carolina native gastropods.



Activities

Learn more about slugs through these activities. Make predictions about what you expect to happen. Were you correct? For most of these activities you can place the slug in a shallow plastic food keeper or sandwich box. Cover with well-ventilated plastic wrap and secure.

Favorite Foods

Add small pieces of several different fruits and vegetables to the container. After six to eight hours, note which foods were eaten. Do not use salted foods as they are harmful to slugs.

Amount of Food

Draw the outline of a piece of lettuce on a piece of graph paper. Mist the lettuce, and add it to your slug container. Can you hear the slug rasping away at the lettuce with its radula? After several hours, remove the lettuce and place it over the outline you drew. How many "squares" of lettuce did the slug consume?

Dark or Light

Place your slug container in a well-lit room. Cover half the container with a dark towel, and place the slug in the center of the container. Which way does the slug move?

Speed of a Slug

Draw a circle 12 inches in diameter on a piece of paper. Mist the paper with water and put a slug in the center. How long does it take the animal to move to the edge? Next time, place a lettuce leaf outside the circle and see if the slug moves faster.

NATIVE MANTLESLUG
PALLIFERA SECRETA

Clifton Repeats as Stamp Winner

The 2012 North Carolina Waterfowl Conservation Stamp and Print, "Redheads in Needlerush," is now available for purchase at the N.C. Wild Store (ncwildstore.com).

The acrylic painting by Delaware artist Richard Clifton was unveiled Feb. 10 at the 17th Annual East Carolina Wildlife Arts Festival and the N.C. Decoy Carving Championships in Washington during an evening preview reception.

This is the first year the N.C. Wildlife Resources Commission is offering signed and numbered regular edition prints with mint stamps at a special reduced price of $120, which is good through June 30. On July 1, the price reverts to the normal $145. Additional stamps are $10 each. The commission will begin shipping pre-ordered prints with stamps on July 1.

Representing the commission at the unveiling were commissioners Mitch St. Clair, Ray White and Wes Seegars; Robert Curry, chief of the commission's Division of Inland Fisheries; and Sen. Stan White of Nags Head.

The unveiling of "Redheads in Needlerush" marks the second year in a row Clifton has won North Carolina's waterfowl conservation stamp and print competition. He took top honors last year with his vivid portrayal of a pair of Canada geese standing in a pasture. He placed second in the 2010 contest with his portrayal of snow geese.

Clifton was one of more than 30 wildlife artists from 20 states to submit entries for the fourth annual North Carolina Waterfowl Conservation Stamp Competition. In 2008, the N.C. Wildlife Resources Commission began partnering with the East Carolina Wildfowl Guild to conduct a nationwide competition open to the public.

This year, artists could submit portraits of redheads, Atlantic brant, Northern shovelers, tundra swans or gadwalls. In addition to Clifton's painting, four others, rounding out the top five entries as selected by a panel of judges on Jan. 30, were unveiled during the reception. They were:

- **2nd Place** – Northern shoveler by Gerald Putt of Boiling Springs, Pa.;
- **3rd Place** – Atlantic brant by Tom Crain of Branson, Mo.;
- **4th Place** – Northern shoveler by Scot Storm of Freeport, Minn.;
- **5th Place** – Northern shoveler by Jeffery Klinefelter of Etna Green, Ind.

The N.C. Waterfowl Conservation Stamp and Print program, established in 1983 by the Commission, generates revenue for waterfowl conservation in the state, including acquiring and improving habitat. The money is used to help North Carolina meet its financial obligations in implementing the North American Waterfowl Management Plan—the international agreement helping restore waterfowl populations throughout the continent.

About the Artist—Richard Clifton

Clifton is an avid hunter and a self-taught wildlife artist. He lives in Milford, Del., on an historic family farm where he is surrounded by inspiration for his art. His waterfowl paintings have won 34 duck stamp competitions, including the 1996 Australian duck stamp and the 2007-08 federal duck stamp—the oldest and most prestigious wildlife art competition in the United States.

Clifton has been named "Artist of the Year" for multiple conservation groups. His work has graced the covers of numerous magazines and appeared on products such as a beer stein for the Coors Brewing Company and shotguns for the Ducks Unlimited National Art Package and National Rifle Association.

Don't Try to Buck the System

A Georgia man apprehended in North Carolina was sentenced to pay a $20,000 fine and ordered to serve six months' probation for attempting to transport deer illegally from Pennsylvania to Georgia.

Donald Lee Vaughn, 48, of Villa Rica, Ga., had been apprehended in Yadkin County, where officers with the N.C. Wildlife Resources Commission determined that there were no transport permits or veterinary health certificates accompanying the deer. He pleaded guilty in federal court in Atlanta on Nov. 30, 2011.

"Shipping wildlife across state lines without testing for illness and disease potentially threatens the health of our wild deer population," U.S. Attorney Sally Quillian Yates said. "Experts tell us that once diseases spread, they are almost impossible to eradicate."

Federal law requires that any deer shipped out of state must be tested for tuberculosis and accompanied by proper ear tags and a veterinarian's certificate. In North Carolina, it is illegal for anyone to possess deer unless they have a proper license or permit and comply with its conditions. Otherwise, the animals are considered contraband and their continued possession is illegal.

Since 2002, except for fawns taken to licensed rehabilitators, it has been illegal to transfer deer between facilities. These measures have been in place to prevent introduction and spread of wildlife diseases including chronic wasting disease.

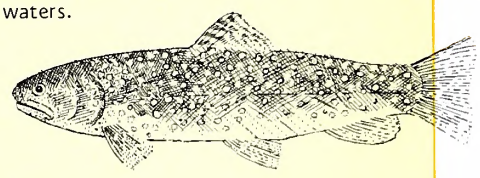
"This case demonstrates that there will be consequences to those who indiscriminately transport wildlife in interstate commerce and jeopardize the welfare of native populations," said Luis J. Santiago, the U.S. Fish & Wildlife Service special agent in charge for the Southeast region.

IN SEASON

In May and June, these seasons are open in North Carolina:

Wild Turkey (male or bearded only): Through May 12

Trout: June 2, harvest begins on Delayed Harvest waters.



There is no closed season or bag limit for groundhog, coyote, striped skunk, nutria and armadillo. There is an open season for taking beaver with firearms or bow and arrow during any other open season for the taking of wild animals.

Check the *2011–2012 North Carolina Inland Fishing, Hunting and Trapping Regulations Digest* for bag limits and applicable maps or visit ncwildlife.org.

Roanoke Ramps Renovated in time for Spring Fishing

MIKE ZLOTNICKI/NCWRC

Just in time for the annual shad and striped bass spawning runs, the N.C. Wildlife Resources Commission has completed renovations to the Gaston Boating Access Area in Northampton County.

With that, the commission has renovated nine of its 10 sites along the Roanoke River, known for its premier striped bass fishing and equally enjoyable shad fishing, in the past decade. See an interactive, clickable map of the Roanoke and the renovated sites at ncwildlife.org.

"Come March, anglers flock to the Roanoke River for great shad fishing, followed closely by arm-wrenching striper fishing," said Erik Christofferson, chief of the commission's Division of Engineering Services. "Some of our access areas along the river have lines of up to 100 cars waiting to launch. With newer, better lots, more launch lanes and more accessible sites, our ramps along the Roanoke are better than ever."

Most recently, the Gaston site received a new ramp with a floating dock and a paved parking lot. Single vehicle spaces are also available for bank anglers, and solar lights have been installed. In 2011, the commission completely revamped the Weldon Boating Access Area. The new ramp has three lanes. The site's lot was paved and landscaped, and the river bank has been stabilized to decrease erosion.

Renovated sites also include Williamston, Hamilton, Water Street Landing and several others. Several of these sites have dedicated fishing piers. Boaters and anglers can use the sites year-round for fishing, recreation and wildlife watching. All are ADA accessible. The renovations were funded through the Sport Fish Restoration Program and motorboat registration receipts.

The N.C. Wildlife Resources Commission opens the entire Roanoke River Management Area to striped bass harvest from March 1 through April 30. From early March until the end of May, the commission will post online weekly fishing reports from the Roanoke River every Thursday afternoon. The fishing reports, along with other updated information on striped bass fishing and boating access areas, will be posted on the commission's blog.

e NEWSLETTER

Get N.C. Wildlife Update—news including season dates, bag limits, legislative updates and more—delivered to your Inbox from the N.C. Wildlife Resources Commission. Sign up at ncwildlife.org/enews.

CALENDAR OF EVENTS

Saturday, May 5

Wooden boat lovers should mark May 5 on their calendars for the 38th Annual Wooden Boat Show that will take place in downtown Beaufort. Enjoy activities and exhibits on display at the N.C. Maritime Museum and the Museum's Watercraft Center. Admission is free and open to the public. Visit ncmaritimemuseum.org for more information.

Wednesday, May 16

The John E. Pechmann Fishing Education Center in Fayetteville is offering a fly-tying course, designed to provide a basic knowledge of fly-tying tools, materials, patterns and techniques. This course is limited to 20 participants. A preregistration deposit of $25 is required, but is refundable at the completion of the course. All tools and materials are provided. To register, contact Tom Carpenter at 910-868-5003 ext. 15 or thomas.carpenter@ncwildlife.org.

Friday–Saturday, June 8–16

Head on down to the Morehead City waterfront to check out the daily weigh-ins for the 54th Annual Big Rock Blue Marlin Tournament. Most billfish are released alive, but a few, along with tuna, dolphin and wahoo, might make it to the scale. Visit thebigrock.com during the week and check out the webcam.

Saturday, June 16

Families are invited to the John E. Pechmann Fishing Education Center in Fayetteville to try their hand at fishing. You may bring your own fishing equipment and bait (natural bait only). No minnows are allowed and this is catch-and-release fishing only. The event is free of charge and open to all ages. Registration will be done on site. Visit ncwildlife.org/Learning/EducationCenters/Pechmann for more information.

Readers should check with the contact listed before traveling to an event. Items for listing should be conservation-oriented and should be submitted at least four months in advance to mike.zlotnicki@ncwildlife.org, or call 919-707-0175.

Randleman Has New Bass Regulations

The N.C. Wildlife Resources Commission implemented new largemouth bass regulations for Randleman Reservoir this spring.

The minimum size limit will continue to be 14 inches; however, the daily creel limit of five fish includes two exceptions: two of the five fish can be less than 14 inches and only one of the five fish can be greater than 20 inches. The current statewide largemouth bass regulation allows anglers to harvest five fish 14 inches or larger daily with the exception that two fish can be less than 14 inches.

The Wildlife Commission took the proposed largemouth bass regulations for Randleman Reservoir to public hearings in September 2011 and the Wildlife Commissioners approved them at their November business meeting.

"Randleman Reservoir is a great place to fish as fish continue to grow rapidly in the newly formed reservoir," said Corey Oakley, a fisheries biologist with the Commission. "These new size and creel limits should protect quality-size fish that many anglers prefer to catch."

This proposal allows for the liberal harvest of fish between 14 and 20 inches and encourages harvest of fish less than 14 inches.

"Such harvest is critical because it reduces competition among fish and allows fish to maintain fast growth rates and attain a larger size," Oakley said. "This proposal provides opportunities for all angling groups to enjoy the recreational fishery while protecting larger, less abundant fish."

Through Nov. 30, 2012, commission fisheries personnel will conduct a creel survey on the 3,200-acre reservoir, which is located in Guilford and Randolph counties, to determine angler catch and harvest. This information will help commission staff determine the popularity of Randleman Reservoir and enumerate harvest on all species in the reservoir. The information will help staff evaluate the effects of the current regulations on the sport fisheries.

For more information on fishing in public, inland waters, visit ncwildlife.org/fishing.

Snakes Blacklisted

The U.S. Fish and Wildlife Service (FWS) has banned the importation and interstate transportation of four nonnative constrictor snakes. Release of snakes into the wild is threatening birds and other animals in the Everglades and other sensitive ecosystems across the United States.

Yellow anaconda

STEFAN GIULIANI

The final FWS rule—which incorporates public comments, economic analysis, and environmental assessment—lists the Burmese python, the yellow anaconda, and the northern and southern African pythons as injurious wildlife under the Lacey Act in order to restrict their spread in the wild in the United States.

The Burmese python has established breeding populations in South Florida, including the Everglades, and caused significant damage to wildlife.

According to a recent study of the intestines of 56 captured Burmese pythons in or adjacent to Everglades National Park, 50 were found to have eaten multiple bird species, including white ibis, limpkins, king rails and clapper rails.

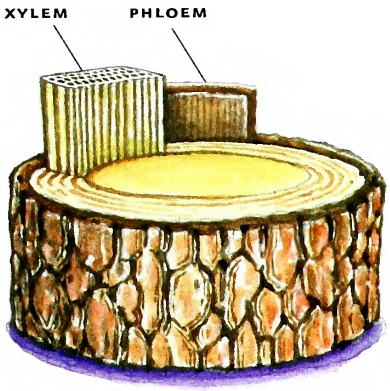
FWS is also considering banning five other species of nonnative snakes that the agency also proposed in 2010—the reticulated python, boa constrictor, DeSchauensee's anaconda, green anaconda and Beni anaconda.

Those who already own any of these four species of banned snakes will be allowed to keep them if allowed by state law. However, they will no longer be able to take, send or sell them across state lines. Those who wish to export these species may do so from a designated port within their state only after acquiring appropriate permits from FWS.

What Happens When Lightning Hits a Tree?

written by Clyde Sorenson
illustrated by Jim Brown

LIGHTNING IS ONE OF THE MOST concentrated and powerful forces in nature; an average lightning bolt packs one trillion watts of power and can heat the air it passes through to 36,000 degrees F. Dramatic phenomena happen when such a force hits a tree.



PINE CROSS SECTION

Lightning typically seeks the shortest route from the cloud it originates in to the ground, so tall objects like isolated or emergent trees are more likely to be hit.

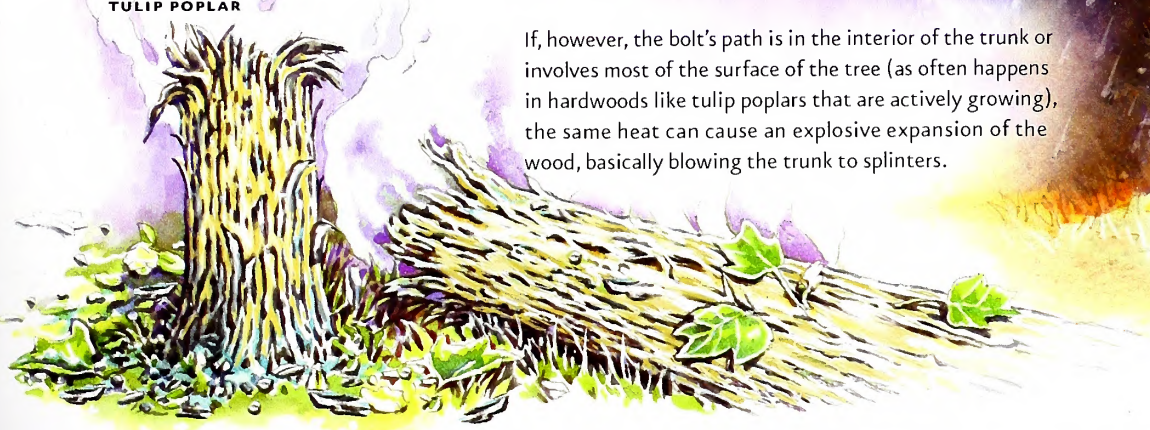
A tree, to lightning, is basically a bundle of water-filled tubes connected to the ground it seeks. While fresh water and wood are not great electrical conductors, they are better than air.

The lightning bolt usually contacts the tree at or near the tree's highest leader, and seeks a conductive path down the trunk. That path could be along rain-soaked bark on the outside of the trunk, or the water-filled conductive tissue in the trunk.

If the charge remains near the surface of the tree (as often happens with thick-barked, small conductive vessel pines), the incredible heat generated by the bolt will vaporize the water on or just below the bark; the resulting steam expansion blows a strip of bark off the trunk marking the path of the lightning bolt. The energy dissipates through the roots- which may kill the tree (or someone standing over the roots).

ENERGY PATH

TULIP POPLAR



If, however, the bolt's path is in the interior of the trunk or involves most of the surface of the tree (as often happens in hardwoods like tulip poplars that are actively growing), the same heat can cause an explosive expansion of the wood, basically blowing the trunk to splinters.

Seize the Carp?

written by Jim Dean

Fishermen are not pleased when the fish they hook turns out to be something other than the trophy they were hoping for—think stingray, dogfish, lizardfish, waterlogged boot. I was certainly less than thrilled with my catch that summer day back in the 1960s.

My buddy Boyd Pfeiffer and I were casting deep-diving crankbaits along the steep banks of Conowingo Reservoir on the Susquehanna River. We had enjoyed surprisingly good bass fishing there, and when I set the hook on a fish that took off like Hogan's goat, I thought it was a monster largemouth. It turned out to be a 12-pound carp. Despite my disappointment, I had to admit that it had been a real handful.

RECENTLY DISCOVERED BAS-RELIEF BY RENAISSANCE ARTIST LEONARDO DI CARPIO

ILLUSTRATION BY JACKIE PITTMAN

While I haven't exactly commenced a love affair with carp, I will admit that my distaste for them has waned, particularly for the widespread and common European carp *(Cyprinus carpio)*. Species of carp in the United States are aliens imported from Europe, Asia or elsewhere, and most of them are unwelcome interlopers, if not outright pests. There are many species, including the Israeli carp, an unlovely brute that has leathery skin with huge scales. The despised silver carp has become a dangerous nuisance in some waters, often leaping into boats.

"While I haven't exactly commenced a love affair with carp, I will admit that my distaste for them has waned."

Grass carp, or white amur, on the other hand, have been put to some benefit because they are herbivorous and are often stocked to control algae and some weeds. By law, those released must be sterile to prevent them from overwhelming public water. Despite their vegetarian diet, however, they will occasionally eat a fly.

A few of my fly-fishing friends have actually targeted both common and grass carp, and I have occasionally joined them. Years ago, I fly-fished for big—and very picky—surface-feeding European carp with small floating dry flies on the Cheoah. I also fly-fished with bass bugs for carp that were cruising the Lake James shoreline sucking in cicadas that were falling into the water. It was intriguing fishing, but I didn't catch any carp, although others who tried it apparently did (or at least said so).

About this time, I also chanced to hook a carp that must have been nearly 20 pounds on a sinking nymph while fishing for bluegills. It towed me all over the pond, and when it finally settled down to slug it out under the boat, I had about as much chance of lifting it off the bottom with a 5-weight rod as I had of cranking in an engine block. Then, there was that opening day of the trout season years ago when chunks of delicious smoked fish were passed around—we were astonished when told we were eating carp.

More recently, David Fussell and some other friends have been stalking big carp on summer mornings in Piedmont lakes, sight-casting to feeding fish that roll and tail on relatively shallow flats (not unlike bonefish in the Caribbean). The fish are spooky and very selective and David has caught only one on a fly—a 26-pounder—but other fishermen have apparently caught them with enough regularity that they are becoming increasingly addicted to the challenge.

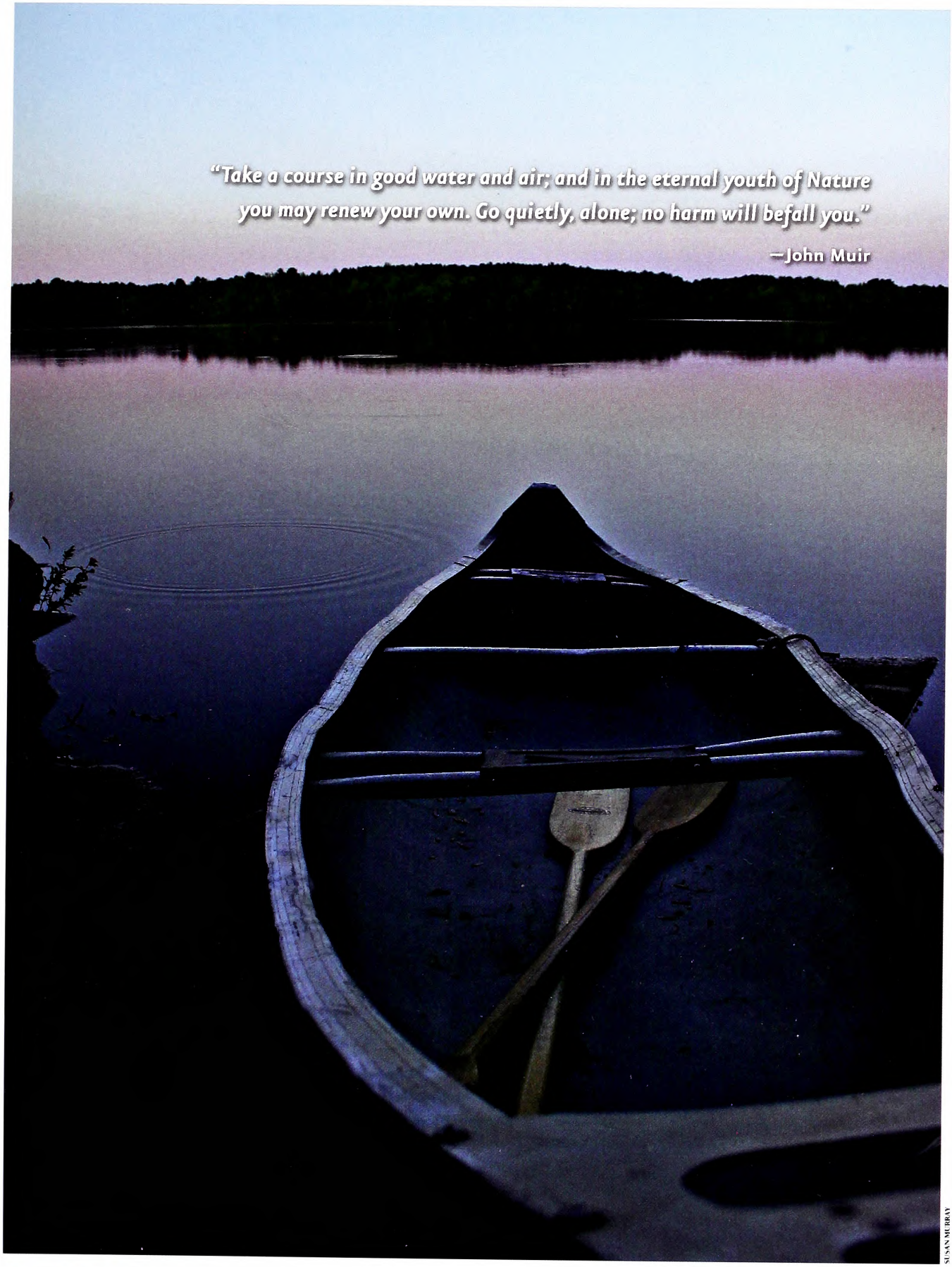
My understanding of how an angling obsession can be made magnificent for even the most plebian species was enhanced by a chance reading of a long and elegantly written article entitled simply "Carp Fishing" by Leslie P. Thompson—first published in Great Britain in 1955 and included by Nick Lyons in his 1970 anthology, "Fisherman's Bounty." Thompson began fishing for carp in the Charles River near Boston in the 1920s, and he became so engrossed in trying to catch them that he kept a diary of each fishing trip, filling it with tackle recommendations, arcane tactics, memorable encounters, recipes and even snippets of poetry by John Bunyan, William Shakespeare, Izaak Walton and others. It was Walton who dubbed the European carp "Queen of the Waters."

Thompson's description of the long history of these fish and the various tactics employed to catch them—not to mention his own obsessive pursuit—very nearly comprise the lyrical bone and marrow of angling. Thompson considered the carp a "very subtle fish," yet he reached the ironic conclusion, after much experimentation, that the best bait was boiled kernels of corn—what we know as Jolly Green Giant niblets.

He even developed a tactic he used to "bait" a likely spot by filling a small metal cup with corn, then casting that device to the desired location. Water would flow into holes bored in the cup, gently lifting the corn and depositing it in an inviting pattern on the bottom to attract carp. Then he would sit back and wait, as no doubt had the Bard of Avon, whom he quotes:

The pleasantest angling is to see the fish
Cut with her golden oars the silver stream
And greedily devour the treacherous bait

What I am wondering is what my fishing buddies will say when they catch me furtively adding a few kernels of corn to my fly.

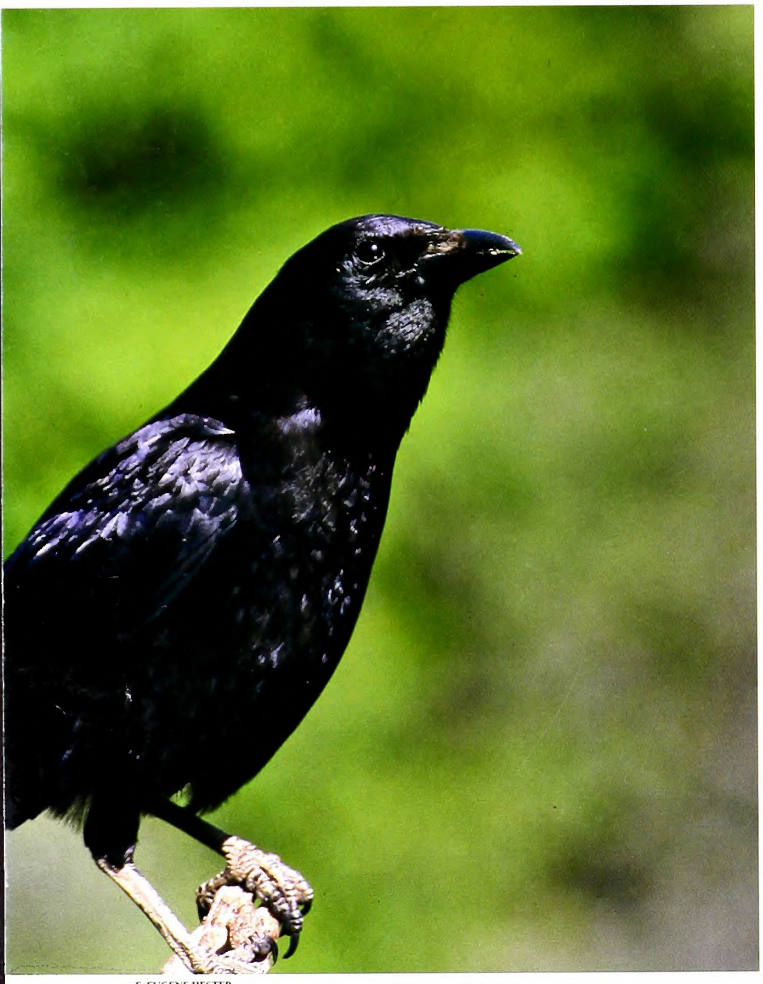


SUSAN MURRAY

OUTDOOR MOMENT

Twilight

IN THE JULY · AUGUST ISSUE



F. EUGENE HESTER

VILLAIN OR BEAUTY?

As both society and our uses of land have changed, so has our attitude toward the American crow.

NOSTALGIA FISHING

Long before fancy boats, fish finders and modern rods and reels, most of us were introduced to a simpler way of fishing.

SEEING SPOTS

It's a scrappy fighter, but the presence of spotted bass can be detrimental to other basses.

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